Appendix A: Notification List

To Whom the Draft EIS, Summary, or Web Availability Notification Was Sent

Elected Officials
Senator Ron Wyden
Senator Gordon Smith
Representative Greg Walden

City of Bend
Bend Department of Public Works
Bend Fire Department
City of Bend

Oregon State Government
Oregon Dept. of Geology and Mineral Industries
Governor's Natural Resource Policy Director
Governor's Forest Advisor
Oregon State Economist, Executive Department
Oregon State University, Area Extension Forester
Economic and Community Development
Department of Land Conservation and Development
Division of State Lands
State of Oregon Water Resources Department
Parks and Recreation Dept., Resource Management and Planning Div.
Oregon Department of Fish and Wildlife
Oregon Department of Forestry
Oregon Department of Environmental Quality, Eastern Region
Oregon Department of Transportation

Federal Agencies
Advisory Council on Historic Preservation, Western Office of Review
Environmental Protection Agency
Federal Aviation Administration, Northwest Mountain Region
Federal Highway Administration, Western Resource Center
Northwest Power Planning Council
Bonneville Power Administration
U.S. Dept. of Agriculture
- Policy and Planning Division
- Natural Resource Conservation Service
- National Agricultural Library Acquisitions and Serials Branch
- Animal and Plant Health Inspection Service
- Forest Service, Pacific Northwest Regional Office
- Deschutes National Forest, Supervisor's Office

Deschutes National Forest, Bend-Ft. Rock Ranger District
U.S. Dept. of Interior
Office of Environmental Policy and Compliance
Bureau of Land Management, Division of Natural Resources
U.S. Fish and Wildlife Service
U.S. Department of Energy
Office of Environmental Compliance
U.S. Department of Commerce
National Marine Fisheries Service, Habitat Conservationists Division
U.S. Department of Defense
U.S. Army Engineers Division, North Pacific
U.S. Dept. of Housing and Urban Development, HUD CPD
Regional Administrator, Federal Aviation Administration Northwest Mountain Region

American Indian Tribes

The Klamath Tribes
The Burns Paiute Tribe
The Confederated Tribes of the Warm Springs Reservation

Organizations

American Forest Resource Council	Bend Recreation
Blue Mountains Biodiversity Project	Bend Clean Air Committee
Cascadia Wildlands Project	Action for Animals
Central Oregon Running Club	Deschutes Basin Land Trust
COMAC Motorcycle Club	Central Oregon Community College
E. Oregon Forest Protection Organization	Deschutes County 4-Wheelers
Earthjustice Legal Defense Fund	Emerald Trail Riders Association
Hi-Desert Four Wheelers	Forest Conservation Council
High Desert Museum	Four Runners
Klamath Forest Alliance	John Muir
Motorcycle Riders Association	Native Plant Society
Natural Resources Defense Council	Northwest Environmental Defense Council
Northwest Land Management	OHA – Bend Chapter
OMSI Science Camps	PROWL
Oregon Natural Resources Council	Sierra Club, Juniper Group
Portland State University	The Wilderness Society
Redmond Four Bangers	Sunriver Owners Association
Sunriver Environmental	Sunriver Fire
Sunset View Estates Homeowners Association	Woodside Ranch Homeowners Association

Businesses

Ace Discount Motorsports	Ochoco Lumber Company
Action Motorsports	Power Trip Motorsports
Boise Cascade Corporation	Prineville Power Sports
Cascade Yamaha-SkiDoo	7th Mountain Management
Cascade Motorsports	Sun Country Tours
Cycle Sports	The Bend Bulletin
DR Johnson Lumber Co.	Tom's World of Wheels
KLE Enterprises	Tye Cattle Co.
KTVZ	Wanderlust Tours, Inc.
Midstate Power Products	

Individuals

Mike Hotchkiss	
William Burton	Allan Holmes
Pam Wise	Bob Wilkens
Kevin Murray	Brandon Bugge
Tom Turner	Cindi O'Neil
James D. Noteboom	Dale Luhman
Pat Harris	Dave & Janette Roth
Dennis Krakow	David H. Tjomsland
Bob Mullong	Daylin Melhorn
Keith & Janet Nash	Dick Nelson
Gina Steward	Gary & Avery Fraizer
Gordon K. Baker	Harriet Heisey
Jim & Judith Knapp	Irwin Holzman
Charla Q. Ranch	James B. & Marsha Stone
Cort Vaughan	Jeremy Boyer
Lawerence Brumwell	John Dotson
Chuck Downen	Jon Cain
Richard Cahl	Kathryn J. Nachand
Sam Sobotta	Keenan Howard
Stephen Roth	Kenneth Burbank
Stan Edwards	Kenneth Doggett
John & Susan Moseley	Kim D. Ward
John & Leslie Hofferd	Lloyd Althison
Kate Kimball	Paul Dewey
Dave McClain	Peggy Speiger
Brian Svedin	Richard Tetz
Maria Boroja	Robert P. Davison
Robert Speik	Roger White
Martin & Marie Hansen	Russell Thomas
The Seidenverg Family	Sam Dinsdale
Tom Sedgwick	Scott Silver
Richard & Ann Ross	Susan & John Pindar
Joani Dufourd	Terry Eccles
James Boydston	Windy Potok

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APPENDIX C: GLOSSARY OF ABBREVIATIONS AND TERMS

Abbreviations

ATV	All Terrain Vehicle
BE	Biological Evaluation
BAER	Burned Area Emergency Rehabilitation
BMP	Best Management Practice
CCF	100 Cubic Feet
CE	Categorical Exclusion
CFR	Code of Federal Regulations
CWD	Coarse Woody Debris
DBH	Diameter Breast Height
DEIS	Draft Environmental Impact Statement
DFC	Desired Future Condition
DNF	Deschutes National Forest
EA	Environmental Assessmemt
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FFE	Fire and Fuels Extension
FEIS	Final Environmental Impact Statement
FSH	Forest Service Handbook
FSM	Forest Service Manual
FVS	Forest Vegetation Simulator
GIS	Geographic Information System
GRT	Green Replacement Trees
HRV	Historic Range of Variability
ICBEMP	Interior Columbia Basin Final Environmental Impact Statement
IDT	Interdisciplinary Team
KV	Knutson-Vandenberg Act
LOS	Late Old Structure
LRMP	Land Resource Management Plan
MA	Management Area
MMBF	Million Board Feet
MIS	Management Indicator Species
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NF	National Forest
NFMA	National Forest Management Act
ODFW	Oregon Department of Fish and Wildlife
OHV	Off Highway Vehicle
PAG	Plant Association Group
TPA	Trees Per Acre

A

Access - Usually refers to a road or trail route over which a public agency claims a right-of-way for public use; a way of approach.

Activity - An action, measure or treatment undertaken that directly or indirectly produces, enhances, or maintains forest and rangeland outputs, or achieves administrative or environmental quality objectives. An activity can generate multiple outputs.

Activity fuels - Fuels generated or altered by a management activity.

Administrative unit - An area under the administration of one line officer, such as a District Ranger, Forest Supervisor, or Regional Forester.

Age class -An interval, usually 10 to 20 years, into which the age ranges of vegetation are divided for classification or use.

Age group distribution - Age class distribution; the location and/or proportionate representation of different age classes in a forest.

Airshed - A geographic area that, because of topography, meteorology, and climate, shares the same air.

Allocation - See Land Use allocation or Resource allocation.

Allotment - See Range allotment.

Allowable Sale Quantity (ASQ) - The quantity of timber that may be sold, from the area of suitable land covered by the Forest Plan, for a time period specified by the Plan. This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity."

Alternative - One of several policies, plans, or projects proposed for decision-making.

Amenity - An object, feature, quality, or experience that gives pleasure or is pleasing to the mind or senses. The terms "amenity values" or "amenity resources" are typically used in land management planning to describe those resources for which monetary values are not or cannot be established (such as clean air and water, or scenic quality).

Arterial Road - Primary traffic route serving a large area and providing travel efficiency for many activities. Arterial roads are non-project roads, usually built with Agency funds.

B

Background - In visual management terminology, refers to the visible terrain beyond the foreground and middleground where individual trees are not visible, but are blended into the total fabric of the stand. Also a portion of a view beyond three to five miles from the observer, and as far as the eye can detect objects.

Bark Beetle – An insect that bores through the bark of forest trees to eat the inner bark and lay its eggs.

Benchmark - The analytical basis from which the alternatives were developed; the use of assessed land capability as a basis from which to estimate the effects of alternative patterns of management on the land.

Benefit - The value of the expected outputs.

Best Management Practices (BMP) - A practice or combination of practices that is the most effective and practical means (including technological, economic, and institutional considerations) of preventing or reducing negative environmental impacts that may result from resource management activities. For example, Best Management Practices are used to reduce the amount of pollution generated by nonpoint sources to a level compatible with water quality goals.

Big Game - Large mammals hunted for sport. On the Deschutes National Forest these include animals such as deer, elk, antelope, and bear.

Big Game Summer Range - A range, usually at higher elevation, used by deer and elk during the summer. Summer ranges are usually much more extensive than winter ranges.

Big Game Winter Range - A range, usually at lower elevation, used by migratory deer and elk during the winter months; usually more clearly defined and smaller than summer ranges.

Board Foot (BF) - The amount of wood equivalent to a piece of wood one foot by one foot by one inch thick.

Browse - Twigs, leaves, and young shoots of trees and shrubs on which animals feed; in particular, those shrubs that are used by big game animals for food.

Bureau of Land Management (BLM) - An agency within the Department of the Interior, with land management responsibility for the Public Domain lands.

C

Canopy - The more-or-less continuous cover of branches and foliage formed collectively by the crown of adjacent trees and other woody growth.

Cavity - The hollow excavated in trees by birds or other natural phenomena, used for roosting and reproduction by many birds and mammals.

Class 1 Area - As defined in the Clean Air Act, the following areas that were in existence as of August 7, 1977: national parks over 6,000 acres, national wilderness areas and national memorial parks over 5,000 acres.

Class 2 Area - All areas outside of class 1 areas in the state of Oregon.

Clearcutting - The cutting method that describes the silviculture system in which the old crop is cleared over a considerable area at one time. Regeneration then occurs from (a) natural seeding from adjacent stands, (b) seed contained in the slash or logging debris, (c) advance growth, or (d) planting or direct seeding. An even-aged forest usually results.

Closure - An administrative order restricting either location, timing, or type of use in a specific area.

Code of Federal Regulations (CFR) - A codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the federal government.

Collector Roads - Roads constructed to serve two or more elements but which do not fit into the other two categories (arterial or local). These roads serve smaller land areas, are usually connected to a Forest arterial or public highway, and are operated for constant service. They collect traffic from Forest roads or terminal facilities

Commercial Thinning - Any type of tree thinning that produces merchantable material at least equal in value to the direct costs of harvesting.

Community Stability - A community's capacity to handle change without major hardships or disruptions to component groups or institutions. Measurement of community stability requires identification of the type and rate of proposed change and an assessment of the community's capacity to accommodate that level of change.

Compaction -The packing together of soil particles by forces exerted at the soil surface, resulting in increased soil density.

Cost Efficiency - The usefulness of specified inputs (costs) to produce specified outputs (benefits). In measuring cost efficiency, some outputs, including environmental, economic, or social impacts, are not assigned monetary values, but are achieved at specified levels in the least costly manner. Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and internal rate-of-return may be appropriate.

Council on Environmental Quality (CEQ) - An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews federal

programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.

Cover/Forage Ratio - The mixture of cover and forage areas on a unit of land, expressed as a ratio. The optimum cover/forage mix for deer on summer range is 60:40.

Crown – The part of a tree, or other woody plant, bearing live branches and foliage.

Cubic Foot (CF) - The amount of timber equivalent to a piece of wood one foot by one foot by one foot.

Cultural Resource - The remains of sites, structures, or objects used by humans in the past-historic or prehistoric.

Cumulative Effects or Impacts - Cumulative effect or impact is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

D

Data - Any recorded measurements, facts, evidence, or observations reduced to written, graphical, tabular, or computer form. The term implies reliability, and therefore provides an explanation of source, type, precision and accuracy.

DecAID – An advisory tool that has been developed to replace the biological potential models for species that utilize dead and partially dead trees and down wood. It is an internet-based summary, synthesis, and integration of published scientific literature, research data, wildlife databases, forest inventory databases, and expert judgment and experience. It offers a way of estimating or evaluating levels of dead wood habitat that provide for a wide array of species and ecological processes. The DecAID Repository is located on the Internet at http://www.fs.fed.us/wildecology/decaid/decaid_background/decaid_home.htm.

Decommission - Activity that results in the stabilization and restoration of unneeded roads to a more natural state.

Deer Winter Range - See Big game winter range.

Dependent Communities - Communities whose social, economic, or political life would change in important respects if market or non-market outputs from the National Forests were substantially decreased.

Diameter at Breast Height (dbh) - The diameter of a tree measured 4 feet 6 inches above the ground on the high side of the tree.

Discount rate - An interest rate that represents the cost or time value of money in determining the present value of future costs and benefits.

Discounting - An adjustment, using a discount rate, for the value of money over time so that costs and benefits occurring in the future are reduced to a common time, usually the present, for comparison.

Dispersed Recreation - A general term referring to recreation use outside developed recreation sites; this includes activities such as scenic driving, hiking, backpacking, hunting, fishing, snowmobiling, horseback riding, cross-country skiing, and recreation in primitive environments.

Disturbance (Ecosystem) – Refers to events (either natural or human caused) that alter the structure, composition, or function of terrestrial or aquatic habitants.

Diversity - The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan.

Draft Environmental Impact Statement (DEIS) - The draft statement of environmental effects that is required for major federal actions under Section 102 of the National Environmental Policy Act, and released to the public and other agencies for comment and review.

Duff - Organic matter in various stages of decomposition on the floor of the forest.

E

Economic Efficiency Analysis - An analytical method in which discounted benefits are compared with discounted costs.

Ecosystem - An interacting system of organisms considered together with their environment; for example, marsh, watershed, and lake ecosystems.

Effects - Environmental changes resulting from a proposed action. Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Effects and impacts as used in this FEIS are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic quality, historic, cultural, economic, social,

or healthy effects, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial.

Endangered Species - Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act.

Enhancement - See Visual quality objective.

Environmental Assessment (EA) - The concise public document required by the regulations for implementing the procedural requirements of the National Environmental Policy Act.

Environmental Impact Statement (EIS) - A statement of the environmental effects of a proposed action and alternatives to it. It is required for major federal actions under Section 102 of the National Environmental Policy Act (NEPA), and released to the public and other agencies for comment and review. It is a formal document that must follow the requirements of NEPA, the Council on Environmental Quality (CEQ) guidelines, and directives of the agency responsible for the project proposal.

Environmental Justice - the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations, without discrimination based on race, ethnicity, or socioeconomic status.

Environmental Protection Agency (EPA) - An agency of the Executive Branch of the Federal Government which has the responsibility for environmental matters of national concern.

Ephemeral - A drainage-way that conveys surface water for short periods of time in direct response to snowmelt or rainfall runoff.

Erosion (rill) - An erosion process in which numerous small channels less than 4 inches deep and 6 inches wide are formed.

Extreme Fire Behavior – "Extreme" implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One or more of the following is usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, strong convection column. Predictability is difficult because such fire often exercises some degree of influence on their environment and behave erratically, sometimes dangerously.

F

Final Environmental Impact Statement - The final version of the statement of environmental effects required for major federal actions under section 102 of the National

Environmental Policy Act. It is a revision of the draft environmental impact statement to include public and agency responses to the draft.

Fire Intensity – The nature of a fire in terms of its rate of energy release. These are physical descriptions of the fires, rather than ecological effects. "Fire intensity is a term that is used to describe the rate at which a fire produces thermal energy. Fire intensity is influenced by the amount of fuel available for burning, local weather conditions before and at the time of the fire, and the topography of the burning site. The limiting factor in fire intensity is the amount of energy stored in the fuel. As a consequence, the greater the fuel loading, the more intensely a fire is likely to burn" (DeBano et al 1998 p. 56-57.).

Fire Management - All activities required for protection of resources from fire and for the use of fire to meet land management goals and objectives.

Fire Regime - A fire regime is defined as the fire frequency or interval: "the average number of years between fires" (Hardy et al, 2001)

Fire Severity or Burn Severity - Severity describes the fire-caused damage to the soil. The severity ratings are based on the following standards (BAER Handbook, FSH 2509.13):

- High severity – More than 40 percent of the area exhibits soil features likely to significantly increase runoff and erosion (e.g., absence of duff layer, hydrophobic soils, soil discoloration).
- Moderate severity – Less than 40 percent of the area exhibits high severity indicators. Duff layers may be absent or mostly absent.
- Low severity – Duff layers are burned but intact. Unburned areas are intermingled with lightly burned areas.

Forage - All browse and non-woody plants that are available to livestock or game animals and used for grazing or harvested for feeding.

Forb - Any herb other than grass.

Foreground - A term used in visual management to describe the portions of a view between the observer and up to 1/4 to 1/2 mile distant.

Forest Land - Land at least 10 percent occupied by forest trees or formerly having had such tree cover and not currently developed for non-forest use. Lands developed for non-forest use include areas for crops, improved pasture, residential, or administrative areas, improved roads of any width, and adjoining road clearings and powerline clearings of any width.

Forest Service Handbook (FSH) - For Forest Service use, directives that provide detailed instructions on how to proceed with a specialized phase of a program or activity.

Forest Service Manual (FSM) - A system of manuals that provides direction for Forest Service activities.

Forest System Roads - Roads that are part of the Forest development transportation system, which includes all existing and planned roads as well as other special and terminal facilities designated as Forest development transportation facilities. See arterial roads, collector roads, and local roads.

Fuel Management - The practice of planning and executing the treatment or control of living or dead vegetative material in accordance with fire management direction.

Fuel Treatment - The rearrangement or disposal of natural or activity fuels (generated by management activity, such as slash left from logging) to reduce fire hazard. Fuels are defined as both living and dead vegetative materials consumable by fire (See Fire and Fuels, Chapter 3, for a definition of various fuel treatment methods).

Fuels - Combustible wildland vegetative materials. While usually applied to above-ground living and dead surface vegetation, this definition also includes roots and organic soils such as peat.

G

Geographic Information Systems (GIS) – Computer software that provides database and spatial analytic capabilities.

Goal - A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed.

Ground Fuels – All combustible materials below the surface litter layer. These fuels may be partially decomposed, such as forest soil organic layers (duff), dead mosses and lichen layers, punky wood, and deep organic layers (peat), or may be living plant material, such as tree and shrub roots.

Guideline - An indication or outline of policy or conduct; i.e. any issuance that assists in determining the course of direction to be taken in any planned action to accomplish a specific objective.

Guzzler - A device for collecting and storing precipitation for use by wildlife or livestock. Consists of an impenetrable water collection area, a storage facility, and a trough from which animals may drink.

H

Habitat - The place where a plant or animal naturally or normally lives or grows.

Habitat diversity - The distribution and abundance of different plant and animal communities and species within a specific area.

Hazard – Any real or potential condition that can cause injury, illness, or death of personnel, or damage to or loss of equipment or property.

Hiding Cover - Vegetation that will hide 90 percent of a deer from the view of a human at a distance of 200 feet or less. The distance at which the animal is essentially hidden is called a "sight distance."

Historic Range of Variablity (HRV) - The historical pattern and abundance of structural stages within watersheds, using pre-settlement (1800-1900) conditions as a reference point.

Historic site - Site associated with the history, tradition, or cultural heritage of national, state, or local interest, and of enough significance to merit preservation or restoration.

I

IDT - See interdisciplinary team.

Impacts - See Effects.

Indicator Species - See Management indicator species.

Indirect Outputs -Outputs caused by an action, but which are later in time or farther removed in distance, although still reasonably foreseeable. See Effects.

Interdisciplinary Team (IDT) - A group of individuals with different training assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve the problem.

Intermittent Streams - A stream which flows only at certain times of the year when it receives water from some surface source, such as melting snow in mountainous areas.

Irretrievable - Applies to losses of production, harvest, or commitment of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

Irreversible - Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors that are renewable only over long time spans, such as soil productivity. Irreversible also includes loss of future options.

Issue - A point, matter, or question of public discussion or interest to be addressed or decided through the planning process. See also Public issue.

L

Land Management - The intentional process of planning, organizing, programming, coordinating, directing, and controlling land use actions.

Landing - Any place where round timber is assembled for further transport, commonly with a change of method.

M

Management Area - Tracts of land grouped into one category having a particular management emphasis.

Management Concern - An issue, problem, or condition that influences the range of management practices identified by the Forest Service in the planning process.

Management Direction - A statement of multiple use and other goals and objectives, and the associated management prescriptions, and standards and guidelines for attaining them.

Management Indicator Species - A species selected because its welfare is presumed to be an indicator of the welfare of other species using the same habitat. A species whose condition can be used to assess the impacts of management actions on a particular area.

Management Practice - A specific activity, measure, course of action, or treatment.

Management Prescription - The management practices and intensity selected and scheduled for application on a specific area to attain multiple use and other goals and objectives.

Management Requirement (MR) - Minimum standards for resource protection, vegetation manipulation, silvicultural practices, even-aged management, riparian areas, soil and water diversity, to be met in accomplishing National Forest System goals and objectives.

Mass Movement - A general term for any of the variety of processes by which large masses of earth material are moved downslope by gravitational forces - either slowly or quickly.

Middleground - A term used in visual management to describe the portions of a view extending from the foreground zone out to 3 to 5 miles from the observer.

Mineral Soil - Weathered rock materials usually containing less than 20 percent organic matter.

Mitigation Measures - Actions to avoid, minimize, reduce, eliminate, or rectify adverse impacts of management practices.

Modification - See Visual quality objective.

Mountain Pine Beetle - A tiny black insect, ranging in size from 1/8 to 3/4 inch, which bores its way into a tree's cambium and cuts off its supply of nutrients, thus killing the tree.

Multiple Use - The management of all the various renewable surface resources of the National Forest System so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some lands will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land and with consideration being given to the relative values of the various resources; and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

N

National Environmental Policy Act (NEPA) of 1969 - An Act to declare a National policy that will encourage productive and enjoyable harmony between humankind and the environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, to enrich the understanding of the ecological systems and natural resources important to the nation, and to establish a Council on Environmental Quality.

National Forest Land and Resource Management Plan - A Plan which " . . . shall provide for multiple use and sustained yield of goods and services from the National Forest System in a way that maximizes long-term net public benefits in an environmentally sound manner."

National Forest Management Act (NFMA) - A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act, requiring the preparation of Regional Guides and Forest Plans and the preparation of regulations to guide that development.

National Forest System (NFS) - A nationally significant system of federally owned units of forest, range, and related land consisting of National Forest, Purchase Units, National Grasslands, and other lands, waters, and interest in lands which are administered by the Forest Service or designated for administration through the Forest Service.

National Forest System (NFS) Lands - National Forests, National Grasslands, or Purchase Units, and other federal lands that have been designated by Executive Order or statute as lands under the management of the Forest Service, including experimental areas and Bankhead-Jones Title 111 lands.

National Register of Historic Places - A listing (maintained by the U.S. National Park Service) of areas that have been designated as being of historical significance. The Register includes places of local and state significance as well as those of value to the Nation.

Natural regeneration - Reforestation of a site by natural seeding from the surrounding trees. Natural regeneration may or may not be preceded by site preparation.

No Action Alternative (Alternative 1) - This alternative is the "No Action" alternative required by the National Environmental Policy Act. It analyzes the effects of continuing management under direction established by the Deschutes National Forest's 1991 Land and Resource Management Plan.

Noxious Weeds – The Forest Service Manual describes a noxious weed as a plant that is aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier of host of serious insects or disease, and being native or new to, or not common to the United States or parts thereof (USDA, Forest Service, 1995c).

O

Objective – A concise, time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals.

Off-Highway Vehicle (OHV) – Vehicle such as motorcycles, all-terrain vehicles, four-wheel drive vehicles, and snowmobiles.

Old-Growth Habitat – Habitat for certain wildlife that is characterized by overmature coniferous forest stands with large snags and decaying logs.

Opportunity – A statement of general actions, measure, or treatments that addresses a public issue or management concern in a favorable way.

Outputs – The goods, services, products, and concerns that are measurable and capable of being used to determine the effectiveness of programs and activities in meeting objectives. Goods, end products, or services that are purchased, consumed, or utilized directly by people. A broad term for describing any result, product, or service that a process or activity actually produces.

Overstory – That portion of the trees, in a forest or in a stand of more than one story, forming the upper or uppermost canopy.

P

Partial Retention – See VISUAL QUALITY OBJECTIVE.

Particulates – Small particles suspended in the air and generally considered pollutants. See TOTAL SUSPENDED PARTICULATES.

Perennial Stream – A stream that flows year round.

Permittee – Any person or business formally allowed to graze livestock on the land of another person or business (e.g.; on state or federal land).

Planning Records - The body of information documenting the decisions and activities that result from the process of developing an EIS, Forest Plan, or significant amendment (also referred to as the Project Record).

Policy - A definite course or method of action selected by a governmental agency, institution, group, or individual from among alternatives and, in the light of given conditions, to guide and usually determine present and future decisions. A specified decision or set of decisions designed to carry out such a chosen course of action.

Precommercial thinning - The practice of removing some of the trees less than marketable size from a stand so that the remaining trees will grow faster.

Prehistoric site - An area that contains important evidence and remains of the life and activities of early societies that did not record their history.

Prescribed fire - A fire burning under specified conditions that will accomplish certain planned objectives.

Prescription - A written direction for harvest activities and regeneration methods.

Present net value (PNV) - The value of the estimated flow of present and future monetary benefits after subtracting present and future monetary costs.

Programmatic Memorandum of Agreement - An agreement between the U.S.D.A. Forest Service, Pacific Northwest Region, the Oregon State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation on the management of two types of cultural resource sites found on the Forest: Depression-era administrative structures and prehistoric lithic scatters.

Public Issue - A subject or question of widespread public interest relating to management of the National Forest System.

Public participation - Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service planning.

R

Raptors - Predatory birds, such as falcons, hawks, eagles, or owls.

Reburn – Reburn results when falldown of the old burned forest contributes significantly to the fire behavior and fire effects of the next fire (Brown 2003).

Record of Decision - A document separate from but associated with an Environmental Impact Statement which states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the alternative have been adopted, and if not, why not.

Reforestation - The natural or artificial restocking of an area with forest trees.

Regeneration - The renewal of a tree crop, whether by natural or artificial means. Also, the young crop itself, which is commonly referred to as reproduction.

Regulations - Generally refers to the Code of Federal Regulations, Title 36, Chapter II, which covers management of the Forest Service.

Rehabilitation - Action taken to restore, protect, or enhance site productivity, water quality, or other resource values over a period of time.

Resource - Anything which is beneficial or useful, be it animal, vegetable, mineral, a location, a labor force, a view, an experience, etc. Resources, in the context of land use planning, thus vary from such commodities as timber and minerals to such amenities as scenery, scenic viewpoints, or recreation opportunities.

Resource Management Plan - A Plan developed prior to the Forest Plan that outlined the activities and projects for a particular resource element independently of considerations for other resources. Such Plans are superseded by the Forest Plan.

Responsible Official - The Forest Service employee who has been delegated the authority to carry out a specific planning action.

Riparian - Pertaining to areas of land directly influenced by water. Riparian areas usually have visible vegetative or physical characteristics reflecting this water influence. Stream sides, lake borders, or marshes are typical riparian areas.

Riparian Area - Geographically delineated areas, with distinctive resource values and characteristics, that are comprised of aquatic and riparian ecosystems.

S

Sale Preparation Costs - Costs associated with preparing a timber harvest on Forest Service lands for sale to the public; usually include all administrative costs for developing sale layout, writing an Environmental Assessment and selling the timber sale.

Scarified - Land in which the topsoil has been broken up or loosened in preparation for regenerating by direct seeding or natural seedfall. Also refers to ripping or loosening road surfaces to a specified depth for obliteration or "putting a road to bed."

Scoping Process -A part of the National Environmental Policy Act (NEPA) process; early and open activities used to determine the scope and significance of the issues, and the range of actions, alternatives, and impacts to be considered in an Environmental Impact Statement.

Sensitive Species – Plant or animal species that are susceptible or vulnerable to activity impacts or habitat alterations. Those species that have appeared in the Federal Register as proposed for classification or are under consideration for official listing as endangered or threatened species, that are on an official State list, or that are recognized by the Regional Forester as needing special management to prevent placement on Federal or State lists.

Silvicultural examination – The process used to gather the detailed in-place field data needed to determine management opportunities and direction for the timber resource within a small subdivision of a Forest area, such as a stand.

Silviculture – The art and science of controlling the established, composition, and growth of forests.

Site preparation – An activity (such as prescribed burning, disking, and tilling) performed on a reforestation area, before introduction of reforestation, to ensure adequate survival and growth of the future crop.

Skidding – A general term for hauling loads by sliding, not on wheels, as developed originally from stump to roadside, deck, skidway, or other landing.

Slash – The residue left on the ground after tree felling and tending, and/or accumulating there as a result of storm, fire, girdling, or poisoning. It includes unutilized logs, uprooted stumps, broken or uprooted stems, the heavier branchwood, etc.

Snag – A standing dead tree.

Socio-economic – Pertaining to, or signifying the combination or interaction of social and economic factors.

Soil – The portion of the earth's surface consisting of disintegrated rock and humus.

Soil productivity – The capacity of a soil to produce a specific crop such as fiber or forage under defined levels of management. Productivity is generally dependent on available soil moisture and nutrients, and length of growing season.

Soil Resource Inventory - See Soil surveys.

Soil surveys - Systematic examinations of soils in the field and in laboratories, their description and classification; the mapping of kinds of soil; the interpretation according to their adaptability for various crops, grasses, and trees, their behavior under use or treatment for plant production or for other purposes, and their productivity under different management systems.

Soil Texture - The relative proportions of the various soil separates in a soil, described by the classes of soil texture. Twelve basic soil texture classes are recognized, such as "loam." The textural classes may be modified by the addition of suitable adjectives when coarse fragments are present in substantial amounts; for example, "stony loam."

Stand (tree stand, timber stand) - An aggregation of trees or other vegetation occupying a specific area and sufficiently uniform in species composition, age arrangement, and condition as to be distinguishable from the forest or other vegetation or land cover on adjoining areas.

Stand Examination Surveys - Procedures to collect data on Forest stands.

Standards and Guidelines - Principles specifying conditions or levels of environmental quality to be achieved.

Subsoiling - The tillage of subsurface soil, without inversion, for the purpose of breaking up dense layers that restrict water movement and root penetration. (Soil Conservation Society of America, 1976).

Suitability - The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices.

Suppression - The process of extinguishing or confining fire.

Surface Fuels - Loose surface litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also grasses, forbs, low and medium shrubs, tree seedlings, heavier branchwood, downed logs, and stumps interspersed with or partially replacing the litter.

T

Temporary Roads - Roads authorized by contract, permit, lease, other written authorization, or emergency operation not intended to be a part of the forest

transportation system and not necessary for long term resource management (36CFR 212.1).

Thermal Cover - Cover used by animals to ameliorate effects of weather; for deer, a stand of coniferous trees 5 feet or taller with an average crown closure of 75 percent or more, or a pole-size or larger stand with 60 percent or more closure.

Thinning - A felling made in an immature stand primarily to maintain or accelerate diameter increment and also to improve the average form of the remaining trees without permanently breaking the canopy. An intermediate cutting.

Threatened Species - Those plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future. See also Endangered species.

Timber Stand Improvement (TSI) - Measures such as thinning, pruning, release cutting, prescribed fire, girdling, weeding, or poisoning of unwanted trees aimed at improving the growing condition of the remaining trees.

Tractor Logging - Any logging method that uses a tractor as the motive power for transporting logs from the stumps to a collecting point, whether by dragging or carrying the logs.

U

Understory - The trees and other woody species growing under a more-or-less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth.

Unroaded Area - Any area, without the presence of a classified road, of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition. Unroaded areas do not overlap with inventoried roadless areas.

Utilization Standards - Standards guiding the projection of timber yields and the use and removal of timber. The standards are described in terms of minimum diameter at breast height, minimum length, and percent soundness of the wood, as appropriate.

V

Vegetative Management - Activities designed primarily to promote the health of the crop forest cover for multiple-use purposes.

Viable Populations - That number of individuals of a species sufficient to ensure the long-term existence of the species in natural self-sustaining populations adequately distributed throughout the planning area.

Visual Quality Objective (VQO) - Categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape.

Preservation (P) - Ecological changes only.
Retention (R) - Management activities should not be evident to the casual Forest visitor.
Partial Retention (PR) - Management activities remain visually subordinate to the characteristic landscape.
Modification (M) - Management activities may dominate the characteristic landscape but must, at the same time, follow naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.
Maximum Modification (MM) - Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.
Enhancement - A short-term management alternative that is done with the express purpose of increasing positive visual variety where little variety now exists.

W

Watershed - The entire land area that contributes water to a drainage system or stream.

Wetlands - Areas that are inundated by surface or ground water often enough to support, and usually do support, primarily plants and animals that require saturated or seasonally saturated soil conditions for growth and reproduction.

Wilderness - Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped federal land retaining its primeval character and influence without permanent improvements or human habitation. Wildernesses are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or a primitive and unconfined type of recreation; are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition, and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest.

Wildfire - Any wildland fire that is not a prescribed fire. See also Prescribed fire.

X, Y, Z

Yarding - Hauling timber from the stump to a collection point.

18 Fire Salvage Project
Biological Evaluation/Assessment

Bend-Ft. Rock Ranger District
Deschutes National Forest
Jim Lowrie, District Wildlife Biologist
FINAL: Version 2.1
September 21, 2004

Introduction

It is Forest Service policy to avoid all adverse impacts on threatened and endangered species and their habitats except when it is possible to compensate adverse effects totally through alternatives identified in a biological opinion rendered by the Fish and Wildlife Service. Measures are to be identified and prescribed to prevent adverse modification or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened, and proposed species (Forest Service Manual, FSM 2670.31). Through the biological evaluation process (FSM 2672.4), actions and programs authorized, funded, or carried out by the Forest Service are to be reviewed to determine their potential for effect on threatened and endangered species and species proposed for listing (FSM 2670.31). Species classified as sensitive by the Forest Service are to be considered through the National Environmental Policy Act process by conducting biological evaluations to determine the potential effect of all programs and activities on these species (FSM 2670.32). No impacts may be allowed on sensitive species that would result in loss of population viability or create significant trends toward Federal listing. The findings of biological evaluations are to be documented in a decision notice or, if applicable, in official files.

The following biological evaluation/assessment evaluates the effects of all proposed alternatives for the 18 Fire Salvage Project including the No Action alternative. For species other than those classified as Proposed, Endangered, Threatened or Sensitive (PETS) refer to the Wildlife Report for the project. A Biological Assessment is prepared for the 18 Fire Salvage Project, because it is a major federal construction project that requires an environmental impact statement.

Effects of the project are evaluated for those PETS species that are documented or suspected to occur within the 18 Fire Salvage Project area. Existing management direction is found in the Deschutes National Forest Land and Resource Management Plan (LRMP; USDA, 1990), as modified by the Regional Forester's Forest Plan Amendment #2 (referenced as the "Eastside Screens"; USDA, 1995). Projects proposed in occupied or potential habitat of any candidate, threatened, or endangered species on the Forest must be consistent with the Project Design Criteria (PDC) for the Joint Aquatic and Terrestrial Programmatic Biological Assessment (BA) for Fiscal Years 2003-06 (USDA et al. 2003), hereafter referred to as the Programmatic BA. Projects that affect the species addressed by the document, and do not meet the applicable PDCs, must initiate the appropriate level of consultation with the Fish and Wildlife Service. PDCs for proposed species may be included in the BA but are optional for the management agencies.

Project Location and Description

The 18 Fire Salvage Project is located approximately four miles southeast of Bend, Oregon within the administrative boundaries of the Bend-Ft. Rock Ranger District on the Deschutes National Forest. The Proposed Action Alternative would salvage 1936 acres of the gross 3810 acre fire area. The elevation averages about 4400 feet and the topography is nearly flat. However, several buttes which were involved in the fire but excluded from the project area are nearby.

The project area provided a low level of habitat diversity for wildlife prior to the fire. Dry, even-aged ponderosa pine forest dominated the area. The stands were classified as “black-bark” which are generally 50-60 years old with one canopy layer. The relatively low elevation and limited precipitation of the area likely preclude the site capability to develop multi-stratum late and old structure (LOS) forest. However, it is capable of producing single-story LOS. There are no natural streams, springs, ponds, lakes or man-made guzzlers in the project area. Other than some minor lava outcrops there are also no special or unique

habitats including cliffs, talus, caves, aspen, mountain mahogany, quaking aspen, or extensive areas of forested lavas.

Approximately 96 percent of the project area is classified as big game winter range that is important to mule deer and elk. Mule deer are the dominant big game species and are distributed across the area throughout the year. Other medium and large mammal species potentially inhabiting this area include black bear, mountain lion, badger, coyote, and bobcat.

A variety of small mammals and birds were present in the project area prior to the wildfire. Refer to the summary table in the Wildlife Report for a partial listing of species. There are no known records of any PETS species occupying the project area. Reference the District files for the Fuzzy and Kelsey Projects which conducted surveys throughout the project area and in an extensive area around the project.

Historic Range of Conditions

The historic population levels of wildlife species endemic to the 18 Fire Salvage Project area are unknown. It is likely those species associated with relatively dry, open ponderosa pine forest with frequent, low intensity wildfire were more common. Fire suppression, timber harvest, road construction, and nearby development on private lands have impacted the wildlife populations of the local area. Species including the flammulated owl, white-headed woodpecker, pygmy nuthatch, Lewis' woodpecker, and olive-sided flycatcher are examples of species that were likely more common historically. Mule deer utilize the area year-around, and due to its low elevation it is particularly important as winter range. Deer numbers have declined from past levels in the North Paulina herd unit due to cumulative effects from elimination or degradation of their habitats.

There was no late successional forest (LOS) present prior to the fire. The understory in the uniform black-bark forest was relatively simple with bitterbrush, manzanita, and Idaho fescue being the dominate species. Openings allowed for greater shrub cover. A plantation of ponderosa pine created after the Bessie Butte Fire in 1996 is present in the northwestern portion of the area adjacent to the project boundary. Rocky outcrops with low tree stocking create some horizontal diversity. In general the area was very homogenous and the nearby buttes (i.e. Luna and Bessie) provided the only topographic diversity.

Existing Habitat Conditions

The fire created a mosaic of burn intensities. Areas with low intensity and small areas of moderate and high intensities (i.e. tree crown mortality), as well as steep slopes have been excluded from the project area (1801 acres). Within the salvage area 100 percent of it is in the moderate/high category of burn intensity. At least 90 percent of moderate burn intensity trees and at least 95 percent of the high intensity trees are dead. The remainder of the fire (i.e. 1801 acres of non-salvage) has 11 percent in moderate/high intensity and 89 percent in low intensity. In total 2420 acres (64%) of the gross area of the fire (3810 acres) were in moderate/high intensity (i.e. stand replacement) regimes.

Species and Habitats Evaluated

The following species and their habitats were considered in the preparation of this document. Those with bolded type are known, suspected or have some potential to occur within the project boundary. There are no known current sites occupied, no known historic sites, and no current or potential habitats for those species that have not been designated.

SPECIES		CLASSIFICATION
Haliaeetus leucocephalus	**Northern bald eagle**	**T, OR/T, MIS**
Strix occidentalis caurina	Northern spotted owl	T, MIS
Felis lynx canadensist	Canada lynx	T
Rana pretiosa	Spotted frog	C, OR/S
Pristiloma arcticum var. *crateris*	Crater Lake tightcoil	S
Histrionicus histrionicus	Harlequin duck	S, SOC
Podiceps auritus	Horned grebe	S
Podiceps grisegena	Red-necked grebe	S, OR/S
Bucephala albeola	Bufflehead	S
Cotumicops noveboracensis	Yellow rail	S
Agelaius tricolor	Tricolored blackbird	S
Centrocercus urophasianus	**Greater or Western sage-grouse**	**S, SOC, OR/S****
Buteo regalis	**American peregrine falcon**	**SOC*, S, OR/E, MIS**
Accipter gentiles	**Northern goshawk**	**SOC*, OR/S**
Buteo regalis	Ferruginous hawk	SOC, OR/S,
Corynorhinus towsendii townsendii	**Pacific western big-eared bat**	**SOC, OR/S, MIS**
Gulo gulo luteus	California wolverine	S, SOC, OR/T
Martes pennanti pacifica	Pacific fisher	S, SOC, OR/S
Sorex preblei	Preble's shrew	SOC
Sylvilagus idahoensis	**Pygmy rabbit**	**S, SOC, OR/S**

Note: *E=Endangered, T=Threatened, C=Candidate for Federal listing, P=Proposed for Federal listing, SOC=USFWS Species of Concern, MIS=LRMP Management Indicator Species. * = Birds of Conservation Concern (USDI, 2002) , S = USFS Region 6 Sensitive, OR/T,E,S = State of Oregon status. **Petitioned for listing but found to not be warranted by the USFWS (USDI, 2003).*

The following species are concluded to not be in or near the project, however the information provided will assist in clarification of the conclusions. The project area is at least 20 miles from nearest known **spotted owl** site, and there is no current or potential habitat in the project area. There is no classified habitat or any other evidence of **Canada lynx** on the Deschutes National Forest. Habitat for **wolverine, lynx** and **fisher** is not found in or near the project area. Fish including the **bull trout** and mid-Columbia basin (Deschutes River basin) **steelhead** have no habitat in or proximate to the project. Nor will the project affect any water resources connected to their habitats.

The **northern goshawk** and **Pacific western big-eared bat** are addressed by the Wildlife Report for this project. Neither species has USFS Region 6 Sensitive status, however the goshawk has been petitioned in the past for federal listing, and the big-eared bat is a former Sensitive species. The following species are included in this assessment because each has a remote possibility (e.g. migration, accidental) of being in the projects area.

American peregrine falcon: The only potential nesting habitat (Cutsi et al. 2001; Johnson and O'Neil, 2001) in the area is 19 miles to the east on the cliffs on the southwest flank of Pine Mountain. However, the cliffs are likely not high enough or sheer enough for adequate security for peregrines to nest. Generally, they nest within one mile of water (Marshall et al. 2003), which is lacking in the project area and at least 6 miles away. Further, there are no potential foraging areas (e.g. riparian zones, marshes) with high numbers of birds in the vicinity of the project. There have been no known observations of peregrine falcons within the project area, however there is the potential for migrating birds to pass through the area.

Pygmy rabbit: This species may occur on the eastern fringe of the District which is 4-5 miles from the project. Pygmy rabbits require relatively tall, dense clumps of sagebrush (i.e. Great Basin or big sage; Gabler et al. 2000) on deep, friable soils (Csuti et al. 2001; Johnson and O'Neil, 2001). Studies suggest that a high canopy cover of sage is required (i.e. 21-36%; Utah Div. of Wildlife, 2003). The volcanic pumice soils of the project area are loose and not conducive to supporting the tunnels built by pygmy

rabbits. Further, the area is dominated by bitterbrush and has very little sagebrush. The fire eliminated almost all of the shrubs.

Greater or Western sage-grouse: Sage-grouse are closely associated with big sagebrush habitat types and are commonly referred to as "sagebrush obligates" (USDI, 2000; Marshall et al. 2003). During the spring and summer months they may use the fringes of open forest habitat types with good herbaceous understories (Connelly et al. 2000). In winter they depend upon low elevation big sagebrush habitats for survival. There are no known lek sites (i.e. breeding/display grounds) on Forest Service lands, however there is a site near Evans Well approximately 11 miles east of the project boundary that is on BLM lands. There are also no known winter or brood rearing grouse habitats within the vicinity of the project (USDI, 1995).

Northern bald eagle: The nearest bald eagle sites are approximately 11 miles to East Lake and 31 miles to the Flat Top site. Bald eagles require an adequate supply of fish, nearby nest site (usually large trees within a kilometer of water), and solitude during nesting (Johnsgard, 1990). There is currently no nesting or roosting habitat in the project area, and there was none prior to the fire either. However there is a remote potential for bald eagles to forage on deer or other carrion in the area.

Environmental Consequences (indirect, direct and cumulative)

Alternative Descriptions— Refer to the project environmental impact statement for a complete description of the alternatives and the environmental consequences. Also, reference the attached Summary of Outputs by Alternative table. Post-fire literature (e.g. McIver and Starr, 2000; Ambrose et al. 2003; Beschta et al. 1995) on salvage harvest was reviewed to further identify issues for evaluation.

Alternative 1 No Action: This alternative would leave the project area as it is post-fire. There would be no salvage harvest, reforestation plantings, or road closures. The area would be allowed to naturally restore itself. The establishment of coniferous trees would be slow and uneven. Grasses, forbs, and some shrub species should recover relatively quickly. However, they would compete with the natural conifer seedlings, and further extend the time of reforestation. Large amounts of dead and down trees would accumulate through time. This may benefit some species but potentially negatively affect some others, e.g. deer movement.

Alternative 2 Proposed Action: The proposed action would salvage harvest within a 1936 acre area of the fire, which had a gross acreage of 3810 acres. Approximately 8.5 million board feet of logs would be removed from 8 individual harvest units. Existing and temporary roads would be used in removing the material. No new, permanent roads would be constructed. After harvest, road/area closures to motorized vehicles would be implemented that would reduce the current density. The area would be reforested after harvest with variable densities of tree planting with dense planting in pre-identified locations for deer cover, movement corridors, and roadside screens.

Alternative 3 Rehabilitation Action: This alternative would not do any salvage harvest. Reforestation would be done in the same way as for the Proposed Action. Road/area closures would also be identical to the Proposed Action.

Indirect and Direct Effects—

Alternative 1 (No Action): There would be no indirect or direct adverse effects or impacts on any of the known or suspected species in the preceding list, because the area would naturally recover and not be salvage logged. None of the assessed Sensitive species are dependent upon ponderosa pine forest and therefore, its recovery rate is not an issue. The northern bald eagle uses ponderosa pine forest for nesting and roosting, but as stated earlier it was not used prior to fire, and the area is totally unsuitable now. The delay in the establishment of forest in this alternative will likely not affect bald eagles.

Alternatives 2 and 3:

Peregrine falcon— There are no known indirect or direct negative impacts on this species by the action alternatives of this project. This determination is based upon: 1) no known occupancy; 2) no cliff habitats (i.e. nesting) are present; and 3) no suitable foraging habitats within the project's area (existing or potential).

Pygmy rabbit— There are no known indirect or direct negative impacts on this species by the action alternatives of this project. This determination is based upon: 1) no probability of any pygmy rabbits occupying the project area due to unsuitable soil types; and 2) no sagebrush dominated plant associations are present (existing or potential).

Greater sage-grouse— There are no known indirect or direct negative impacts on this species by the action alternatives of this project. This determination is based upon no known occupancy and no suitable (existing or potential) habitats within the project area.

Northern bald eagle— There are no known indirect or direct negative impacts on this species by the action alternatives of this project. This determination is based upon the fact that the potential nesting and roosting habitat has been eliminated by the fire. Further, the project would not affect their access to forage resources (i.e. big game carrion).

Cumulative Effects— Cumulative effects on habitats by the No Action alternative include: 1) Additional stand replacement fire acreage when totaled with the other fires in the vicinity (e.g. Evans West and Skeleton). In addition, the long recovery period for areas that are not reforested (e.g. Skeleton fire) will further delay the attainment of LOS forest habitats over a large area. 2) The eventual accumulation of large amounts of down and dead material in the area may be a risk to future high severity wildfires, which could potentially seriously impact the soil resources (i.e. heavy log sized fuels on the ground) and further delay the establishment of a functioning forest.

The Proposed Action alternative would mitigate the loss of coniferous habitat in the area by reforestation. However, the benefits would at best be in the mid-term (i.e. 15+ years). Road closures would contribute to reducing the cumulative effects from roads in this general area (i.e. loss of solitude). Reducing the volume of woody debris by salvaging would reduce the probability of future high severity wildfires which could impact an area much larger than the project. It would also facilitate the movement of some species through the area. The salvage logging would whole tree yard all the harvested trees which would greatly reduce potential post-logging fuel accumulations.

The cumulative effects of the Proposed Action on species common to ponderosa pine forest habitat are as follows: 1) those species requiring open canopied forest structure would benefit because the forest would be re-established more quickly. Further, maintaining 60% of the area in relatively low tree densities (i.e. deer forage areas) would also benefit this group; 2) species requiring heavy canopied, multi-stratum LOS habitat would not be adversely affected because the low site productivity of the area likely precludes growing this type of habitat; and 3) cavity dependent species would be provided for by the retention levels of snags. However several species would have snag levels post-salvage that are below suggested levels within the salvage area (Marcot et al. 2003). The magnitude of this adverse effect is not significant at the population level of these species. This is because the project area is very small compared to their home ranges. Within unit mitigation patches and the non-salvaged areas adjacent to the project (i.e. 47% of the fire area) should mitigate these effects.

The Rehabilitation Action alternative would have affects in common to both previous alternatives including the accumulation of large amounts of down and dead material (generally negative), the restoration of forested habitats (positive), and road closures (positive). The reforestation investments could potentially be lost to future catastrophic wildfire due to heavy fuels accumulations, which would further delay providing open canopied forested habitats for many species.

Cumulative and future effects common to all the alternatives include:

- Increased natural fuel loadings and risk of future wildfire. The duration of this risk is unknown, but likely extend to the long-term (i.e. 50+ years).
- Increased probability of insect attacks on residual and adjacent green trees due to the attraction to standing and down snags. The magnitude and duration of this effect are unknown.
- Past prescribed burns and timber harvest areas (10-20 years old) where bitterbrush and deer cover have not fully recovered.
- The Fuzzy Project (implementation) has affected deer cover and movement corridors, forage (i.e. bitterbrush), forested habitats, road densities, etc. There is a minor overlap of the two projects. Most negative effects from the Fuzzy Project were mitigated via the environmental assessment, but it was predicted that the North Paulina deer herd would be reduced (Becker, 2000).
- The future Kelsey Project will be affecting deer cover and movement corridors, forage, forested habitats, road densities, etc., and it overlaps most of the salvage project. The environmental assessment is currently being revised to account for the cumulative affects of the 18 Fire and planned Kelsey activities. The 18 Fire Project does not add to the effects on deer hiding/thermal cover or raptor habitat as examples, because the fire eliminated these habitats. In fact, alternatives that include reforestation will facilitate the recovery of these habitats.
- The current 18 Fire Road Salvage Project is removing snags from a narrow strip along the major roads through the fire area (73 acres). It is not expected to contribute to cumulative effects on snag dependent species due to the limited area impacted. Further, a minimum of 3 snags per acre together with green-tree-retention will mitigate the salvage effects on indicator species.
- Existing roads, motorized trails, gas line corridor, gravel pits, etc. are throughout the surrounding area. The Proposed Action alternative will only add temporary road impacts, which will be of short duration and of minor magnitude to the wildlife resources of the project area. Post-project road closures will reduce the current density of 3.6 to 1.9 miles per square mile.

There are no adjacent private lands or BLM administered lands to the project area that would have a significant contribution to the cumulative effects of this project. There is no current active livestock grazing in the project area that would contribute to cumulative effects. Active grazing by sheep and goats may occur within two years. Cumulative effects from the grazing are not expected, provided that utilization standards are met.

In conclusion, there are no known adverse cumulative effects from the 18 Fire Salvage Project on any PETS species. This determination is based upon: 1) there is no known occupancy by any PETS species within the project area or within the local vicinity; 2) the project effects will not eliminate or degrade any existing or potential PETS species' habitats; and 3) there are no known or expected PETS species' migration or temporary uses of the area, because the area does not have any essential suitable habitat presently, nor any significant future potential. This includes the northern bald eagle, because they prefer to nest near water bodies with good fish populations for foraging (Marshall et. al, 2003). Winter foraging on big game carrion by bald eagles has not been observed in this area, and it is not an important source site for them. The nearest known area where bald eagles forage on big game carrion (i.e. road kills) is along State highway 31 southeast of La Pine, Oregon, which is over 30 miles distance.

Compliance with Project Design Criteria (PDCs)

All potentially applicable PDCs from the Programmatic BA species were reviewed. Compliance is not a question for the project given that the only potential species for consideration are the greater sage-grouse, which is not present or a potential occupant of the project area, and the northern bald eagle, which has a very low probability of using the area and would not be affected by any alternative of the project.

Conclusions

For Region 6 Sensitive Species:

American peregrine falcon— No Impact

Pygmy rabbit— No Impact

Greater sage-grouse— No Impact

For species with federal status:

Northern bald eagle— No Effect

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18 Fire Salvage Project
Wildlife Report

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Deschutes National Forest
FINAL: ***Version 2.3, 9/21/04***

Table of Contents

Introduction

The following report meets the direction provided by the Forest Service Manual (FSM 2600), the Deschutes National Forest (DNF) Land and Resource Management Plan (LRMP; USDA, 1990), and the Environmental Assessment for the Continuation of Interim Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales (referenced as the "Eastside Screens"; USDA, 1995). It specifically addresses the 18 Fire Salvage Project effects upon Management Indicator Species (MIS) as designated by the LRMP, ecological indicator species and/or habitats as described in the FSM, and Species of Concern (SOC) or Sensitive (S) as respectively designated by the Fish and Wildlife Service (FWS; USDI, 2000) or the Oregon Department of Fish and Wildlife (ODFW, 1997). Species that are addressed by the Migratory Bird Treaty Act (MBTA) and the related Executive Order of 2001 (#13186; The White House, 2001) are also noted. The report does not address those species designated as threatened, endangered or proposed/candidate for federal listing under the Endangered Species Act. For these species and for those designated as Sensitive by the Forest Service Regional Office (Region 6; USDA, 2000) refer to the Biological Evaluation/Assessment (BE/BA) for this project.

Landscape Overview

The 18 Fire Salvage Project is located approximately four miles southeast of Bend, Oregon within the administrative boundaries of the Bend-Ft. Rock Ranger District on the Deschutes National Forest. It encompasses the gross 3810 acre fire area but only proposes to treat 1936 acres within it. The elevation averages about 4400 feet and the topography is nearly flat. However, several buttes which were involved in the fire but excluded from the project area are nearby.

The project area provided a low level of habitat diversity for wildlife prior to the fire. Dry, even-aged ponderosa pine forest dominated the area. The stands were classified as "black-bark" which are generally 50-60 years old with one canopy layer. The relatively low elevation and limited precipitation of the area likely preclude the site capability to develop multi-stratum late and old structure (LOS) forest. However, it is capable of producing single-story LOS. There are no natural streams, springs, ponds, lakes or man-made guzzlers in the project area. Other than some minor lava outcrops there are also no special or unique habitats including cliffs, talus, caves, aspen, mountain mahogany, or extensive areas of forested lavas.

Approximately 96% of the salvage area (1868 acres) within the fire is classified as big game winter range that is important to mule deer and elk. Mule deer are the dominant big game species and are distributed across the area throughout the year. Other medium and large mammal species potentially inhabiting this area include black bear, mountain lion, badger, coyote, and bobcat.

A variety of small mammals and birds were present in the project area prior to the wildfire. Refer to the following table for a partial listing of species. Species bolded and italicized will be evaluated to determine recommendations for the project.

Table 1: Selected Wildlife Species Summary

Species	Occur-rence*	Management Indicator Species	FWS Species of Concern	ODFW Sensitive Species	Ecological Indictor Species**
Northern goshawk (NTMB, MBTA)	S/G5	X	X	X	X (1)
Sharp-shinned hawk (NTMB, MBTA)	S/G5	X			(4)
Red-tailed hawk (NTMB, MBTA)	C/G5	X			(7-generalist)
Cooper's hawk (NTMB, MBTA)	S/G5	X			
Golden eagle	U/G5	X	BCC (BCR 9)		(6)
Flammulated owl (NTMB, MBTA)	U/G4		BCC (BCR 9)	X	X (1, 2a, 4, 5-interspersed grassy openings and thickets)
Northern pygmy- owl (MBTA)	U/G5			X	(2a, 7-open forests, edges)
Lewis' woodpecker (NTMB, MBTA)	U/G4	X	BCC (BCR 9)		X (2a-large snags, 7-burns)
White-headed woodpecker (MBTA)	U/G4 (declining, local extirp-ation, BBS)	X	BCC (BCR 9)	X	X (1-PP, 2a, 2b, 7-sugar pine foraging, large LOS patches)
Hairy woodpecker (MBTA)	C/G5				X (2a, 2b, 7-burns)
Black-backed woodpecker (MBTA)	R/G5	X		X	X (1-LPP, 2a, 2b, 7-burns)
Williamson's sapsucker (NTMB, MBTA)	R/G5 (declining, BBS)	X	BCC (BCR 9)	X	X (2a-large snags, 2b, 7-higher elevations)
Pygmy nuthatch (migratory, MBTA)	U/G5			X	X (1-PP, 2a, 2b, 7-large trees)
White-breasted nuthatch (migratory, MBTA)	U-C/G5				X (1-PP, 2a, 2b)
Mountain chickadee (migratory, MBTA)	C/G5				(1, 2a, 2b, 5)
Green-tailed towhee (NTMB, MBTA)	U/G5				X (3)
Olive-sided flycatcher (NTMB, MBTA)	U-C/G4 (declining, BBS)		BCC (BCR 5)	X	X (1, 2a, 7-burns, clearings, edges w/ conifers)
Dusky flycatcher (MBTA)	U/G5				X (3, 7- clear-cuts)
Chipping sparrow (NTMB, MBTA)	U/? (declining, BBS)				X (7- open understory w/regenerating pines)
Mountain bluebird (NTMB, MBTA)	U-C/G5				X (2a, 7- burns, openings)

Table 1 continued

Species	Occur-rence*	Management Indicator Species	FWS Species of Concern	ODFW Sensitive Species	Ecological Indictor Species**
Rock wren (MBTA)	U/G5				X (7-talus, rock, clear-cuts)
Mule deer	C	X			(7-shrubs winter range)
American marten	R	X		X	X (1-MC, LPP, 7-CWM concentrations)
Yellow-pine chipmunk	C				X (2a, 2b)
Townsend's big-eared bat (Pacific western)	S	X	X	X	(3-foraging, 6-caves)
Western small-footed myotis	S		X	X	(3-foraging, 6-cliffs, 7-bark of trees)
Long-eared myotis	S		X	X	(2a, 2b, 6, 7-open forest, bark of trees)
Long-legged myotis	S		X	X	(2a, 6, 7-bark of trees)
Palid bat	S			X	(6, 7-roosts in trees)
Silver-haired bat	S			X	(2a-cavities, 7-forages in forest, bark of trees)
Northern sagebrush lizard	S		X		X (2b, 3, 6-rock outcrops,
Western fence lizard	C				X (2b, 6-rocks)
Western skink	S				X (2b)
Western toad	U				X (2b)
Rubber boa	S				X (2b)

***Note:** Relative abundance (18 Fire area only, pre-fire occupancy) codes: C = common, U = uncommon, R = rare, S = suspected but not confirmed, i.e. potential habitat available/Global Conservation Status: G4 Apparently Secure, G5 Secure (source Nature Serve). ** Special habitat requirements codes: 1 = late and old successional forest (LOS), 2a = snags, 2b = logs, 3 = mature shrubs, 4 = dense conifers for nesting/foraging, 5 = meadows or grassy openings for foraging, 6 = special/unique habitats (rock, cliffs, caves, etc.), 7 = other, noted. Abbreviations: LPP = lodgepole pine, PP = ponderosa pine, MC = mixed conifer, CWM = coarse woody materials (logs and limbs > 3" in diameter), NTMB = neotropical migrant bird, MBTA = Migratory Bird Treaty Act listing. FWS Species of Concern includes species identified by the 2002 Birds of Conservation Concern (BCC) publication (USDI, 2000) with the applicable Bird Conservation Region (BCR; BCR5 is the Northern Pacific Forest and BCR9 is the Columbia Basin). Other references included: Guenther and Kucera, 1978, USDA, 1990 and 2000, ODFW, 1997, Csuti et al. 2001, Marshall et al. 2003, and USDI, 2001.*

Historic Range of Conditions

The historic population levels of wildlife species endemic to the 18 Fire Salvage Project area are unknown. It is likely those species associated with relatively dry, open ponderosa pine forest with frequent, low intensity wildfire were more common. Fire suppression, timber harvest, road construction, and nearby development on private lands have impacted the wildlife populations of the local area. Species including the flammulated owl, white-headed woodpecker, pygmy

nuthatch, Lewis' woodpecker, and olive-sided flycatcher are examples of species that were likely more common historically. Mule deer utilize the area year-around, and due to its low elevation it is particularly important as winter range. Deer numbers have declined from past levels in the North Paulina herd unit due to cumulative effects from elimination or degradation of their habitats.

Prior to the wildfire, the project area was dominated by a relatively young (i.e. "black-bark"), even-aged ponderosa pine stand. There was no late successional forest (LOS) present prior to the fire. The understory was also relatively simple with bitterbrush, green manzanita, and Idaho fescue being the dominate species. Openings allowed for greater shrub cover. A plantation of ponderosa pine created after the Bessie Butte Fire in 1996 is present in the northwestern portion of the area adjacent to the project boundary. Rocky outcrops with low tree stocking create some horizontal diversity. In general the area was very homogenous and the nearby buttes (i.e. Luna and Bessie) provided the only topographic diversity.

Existing Habitat Conditions

The fire created a mosaic of burn intensities. Areas with low intensity and small areas of moderate and high intensities (i.e. tree crown mortality), as well as steep slopes, have been excluded from the project area (1801 acres). Within the salvage area 100% of it is in the moderate/high category of burn intensity. At least 90% of moderate burn intensity trees and at least 95% of the high intensity trees are dead. The 1801 acres of non-salvage has 11% in moderate/high intensity and 89% in low intensity. In total 2420 acres (64%) of the gross area of the fire (3810 acres) were in moderate/high intensity (i.e. stand replacement) regimes.

Big Game— As previously noted, approximately 96% of the project salvage area is classified as winter range (i.e. LRMP Management Area 7, Deer Habitat). Both deer and elk use the area and are expected to continue post-fire, however it will take several years of recovery before use levels begin to increase. Bitterbrush, *Purshia tridentata*, and other shrubs sustained a high level of mortality from the fire, except in a few patches in openings. Bitterbrush and sagebrush, *Artemisia spp*., are species that are easily killed by fire. In low intensity fires bitterbrush may sprout from root collar buds, but it is unlikely in high severity intensity fires. Sagebrush does not sprout. Rodent caches of bitterbrush seed may have survived the fire and assist in recovery. Grass species such as Idaho fescue, *Festuca idahoensis*, will likely recover very quickly. Herbaceous plants will be more valuable to wintering elk than mule deer, which prefer woody browse plants in the winter months. Areas over 600 feet from the remaining hiding/thermal cover around the fire perimeter will likely not be fully utilized by big game species (Thomas et al. 1979).

Coniferous hiding and thermal cover for big game has been eliminated by the fire. Some marginal vegetative cover still remains in those areas of lower intensity burn next to the project boundary. Topographic features and burnt snags provide some screening for big game. Unburned areas adjacent to the fire are dominated by single-story black-bark ponderosa pine which generally provides marginal cover at best. Previously designated deer movement corridors have also been eliminated by the fire (reference the analysis files).

Other Species— There is a complex group of wildlife winners and losers post-fire. Those animals requiring dense or mature forest will be reduced or eliminated. Others favoring open habitats, snags, and grass dominated environments will be favored. Woodpeckers, sapsuckers, robins, juncos, red-tailed hawks, and gophers will all be present in the fire area in the near-term. There were no known raptor nest sites within the project area prior to the fire. The relatively uniform black-bark pine habitat provided limited nesting habitat for sharp-shinned hawk,

Cooper's hawk, and northern goshawk. Wildlife surveys had been previously done by the Fuzzy Project (implementation phase), which overlapped a minor amount of the project on the east side, and by the Kelsey Project (planning phase), which covers the majority of the 18 Fire area. Field reconnaissance was done post-fire but no formal surveys for any species were done.

Shrub Habitat— Shrubs, primarily bitterbrush, provide critical mule deer winter forage. They also provide nesting and foraging habitat for shrub-associated species (e.g. yellow-pine chipmunk and golden-mantle ground squirrel), and neotropical migrant birds, such as green-tailed towhee (Paige and Ritter, 1999). Many of these species, particularly the seed-caching rodents, such as the yellow-pine chipmunk, serve an important ecological role in the regeneration of shrub species (Vander Wall, 1994). Refer to the section of the report on Indicator Species for more detailed information on species dependent upon shrub habitats.

Roads and Trails— The area has a road density of 5.7 miles per square mile. There is one horse trail in the vicinity of Bessie Butte adjacent to the project area. Direct and indirect impacts to habitats from existing roads have been moderate to high depending on the class (i.e. width, level of use) of road, its location, and the season of use.

Late and Old Structure Habitat (LOS)/Old Growth Management Areas (OGMA)— There was no classified LOS present in the project area or designated OGMAs (USDA, 1990). However, there is an OGMA about one mile west of the project.

Connectivity and Fragmentation— Prior to the fire several connectivity areas had been designated and maintained through the project area for deer movement and OGMA/LOS connectivity. The fire has eliminated major portions of two corridors, which are not recoverable in the short-term. The southern corridor has been partially damaged. Fragmentation was low in the area and was primarily related to the effects of the adjacent Bessie Butte fire and roads. Past timber harvest had been selective cutting and not seed tree harvest or clear-cuts, which would fragment the landscape.

Snags, Green Trees and Coarse Woody Materials (CWM) Habitats— A snag is defined as a dead or partly dead tree (or stump per Johnson and O'Neil, 2001) that is over 4 inches in diameter-at-breast-height (dbh) and taller than 6 feet (Thomas et al. 1979). Coarse woody material (CWM) or woody debris is the accumulation of dead woody material on the forest floor including limbs and logs (Thomas et al. 1979). Numerous species of animals use snags and CWM for foraging, nesting, denning, roosting and resting. The most notable of the wood-using wildlife species are the primary cavity nesters including woodpeckers and nuthatches that excavate nest cavities in decayed wood in standing dead and green trees. Vacated cavities are subsequently used by many other birds and small mammals (i.e. secondary cavity users). Selected wildlife species known or suspected to occur in the pre-fire project area that utilize these habitats include the flammulated owl, northern pygmy owl, white-headed woodpecker, Williamson's sapsucker, pygmy nuthatch, white-breasted nuthatch, mountain bluebird, western small-footed myotis, long-eared myotis, long-legged myotis, pallid bat, and silver-haired bat. Refer to Table 1 for individual species' management status and occurrence within the project area.

Desired conditions of snag and CWM habitat are based in part on management recommendations and standards and guidelines provided by the Deschutes National Forest Land and Resource Management Plan (USDA, 1990), Deschutes National Forest Wildlife Tree and Log (WLTL) Implementation Strategy (USDA, 1994), and the Revised Interim Management Direction (i.e. Eastside Screens; USDA, 1995).

The Proposed Decision for the Interior Columbia Basin Final Environmental Impact Statement (ICBEMP; USDA & USDI, 2000) and Draft Environmental Impact Statement (EIS) for ICBEMP were also reviewed. Neither document was ever finalized or required direction, however they did summarize the best available scientific information at the time. Standard B-S29 of the Proposed Decision indicates that the tables in Appendix 12 (in Volume 2 of the Supplemental Draft EIS) were proposed to determine snag numbers and coarse woody debris levels whenever vegetation management is done. If adequate numbers of snags greater than 21 inches diameter-at-breast-height (dbh) are not available prior to vegetation management activities to meet the levels indicated in Appendix 12, then a mix of the largest snags available was suggested. The Supplemental Draft EIS direction (Appendix 12) recognized that the broad standards would require fine-tuning for more local ecological conditions. The ICBEMP snag and CWM guidelines were focused on maintaining snags and CWM >21 inches dbh and did not adequately address snags and CWM less than 21 inches dbh, or size and density by plant association group (PAG). Within the 18 Fire Salvage Project area, snags and CWM greater than 21 inches dbh are limited, which restricts the utility of using the ICEMP guidelines.

The DecAID Advisor (Marcot et al. 2003) was extensively utilized in the analysis of existing conditions and in the recommended desired conditions for snags and down wood cover, which are addressed in a following section. This reference is available at http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf.

Other literature including the report by Beschta et al. 1995, was reviewed, but DecAid was concluded to be the most current scientific information on this topic. The following table summarizes the present levels of snags within the project area (refer to the map in the Appendix for unit locations).

Table 2: Existing Post-Fire Snag Levels

Unit	Diameter Mid-Point	Ht.	No. Per Acre	Notes
1	6”	35’	15.8	Total of 49.7 tons of material per acre.
(1539 ac)	9	55	18.8	
	12	65	17.8	
	15	80	13.1	
	18	90	4.9	
	24	110	5.3	
2/3	6	“	28.6	Total of 48.4 tons of material per acre.
(27 ac./23 ac.)	9		14.3	
	12		17.1	
	15		10.0	
	18		11.4	
	24		2.9	
4	6	“	4.7	Total of 71.8 tons of material per acre.
(142 ac.)	9		16.5	
	12		35.3	
	15		22.4	
	18		8.2	
	24		5.9	
5	6	“	8.9	Total of 32.8 tons of material per acre.
(34 ac.)	9		11.1	
	12		37.8	
	15		8.9	

	18		2.2	
	24		0	
6/7	6	"	11.1	Total of 61.2 tons of material per acre.
(29 ac./34 ac.)	9		14.4	
	12		11.1	
	15		14.4	
	18		12.2	
	24		6.7	
8	6	"	12.0	Total of 46.0 tons of material per acre.
(108 ac.)	9		30.0	
	12		30.7	
	15		14.7	
	18		4.0	
	24		1.3	
Out-side*	10.6-13.5		10.8 dead/15.2 live	* Two outside areas: s. of road #9711/southern portion of fire (i.e. non-salvage areas)
	13.6-16.5		6.4/12.8	
	16.6-19.5		1/5	Note: total of 19.2 snags/ac. >10.6" dbh outside
	19.6+		1/3.2	Note: total of 36.2 live/ac. >10.6" dbh outside

***Note**: Source Jim Schlaich, Project Team Leader. Independent snag transects resulted in similar data, but it was noted that there were areas throughout the project area with openings and much lower snag levels. The above data represent averages of the plots taken. In summary, there are approximately: 30 snags/acre >8" dbh; 25 snags/acre >9" dbh; and 17 snags/acre >10" dbh in the salvage area. Live trees had to have a minimum of 20% green crown.*

The fire consumed the majority of down logs and smaller coarse woody materials, so there was no data to collect on these habitat features. For reference, the pre-fire snag levels were averaged (5 inventory stands) as follows (all ponderosa pine): 12"-24" diameter-at-breast-height (dbh) 3.1 snags per acre; 21"+ dbh <.1 snag per acre (source P. Powers, project silviculturist; FVS data runs).

Desired Future Conditions

Indicator Species— The following table displays habitat and information for selected Management and Ecological Indicator Species from Table 1. Selected species reflect the capability of the project habitats. Both short-term and long-term habitat objectives are displayed in the Habitat Description section. The territory and/or home range sizes will be used in the development of the spatial arrangement of habitat components.

Table 3: General Objectives for Management and Ecological Indicator Species

Species	Territory or Habitat Unit Size	Habitat Description
Mule deer	Patches 6+ acres of hiding/thermal cover	Establish coniferous trees for future hiding and/or thermal cover in patches no greater than 1200' apart on 40% of the planning area with a ratio of 10:30 hiding to thermal cover. Provide movement corridors of cover at least 600' wide no greater than ½ mile apart.
Flammulated owl	Home range 25 ac. Territory 15-30 acres.	Prefer open ponderosa pine or mixed conifer with limited understory and large trees. Forage in openings, meadows, along edges. Secondary cavity nester (22-28" dbh snags).
***Lewis'**	Territory 15 ac.	Open forests. Patches of burned forest. Target >50% of burns

woodpecker		un-salvaged. Retain all snags >21" dbh and 50% of snags 12-21" in fire salvages. Overall, retain 25 snags per acre 9"+ dbh in burns. Usually secondary nester but may excavate (12"+ snags, with 26" mean).
Williamson's sapsucker	Territory 10-20 ac.	Prefer open ponderosa pine for nesting. Excavate soft, decayed wood (12" dbh minimum, with 21"+ preferred). 1.5 snags/ac.
Hairy woodpecker	Territory 25 ac.	Open forests along edges and in burned areas. Primary excavator (10" minimum, with 17"+ preferred). 1.3-1.9 snags/ac. (burns 41.8/ac.) Light to moderate decay usually.
****White-headed woodpecker***	Home range 250-500 ac.; territory 20 ac.	Open old-growth ponderosa pine with large trees for foraging and snags for nesting. Pine seeds (ponderosa and sugar) are important forage in the winter. Will use short snags and tall stumps in open areas (averages 12% canopy cover). Target 10 trees per acre >21" dbh with >2 trees per acre >31" dbh; 10-40% canopy closure; 1.4 snags per acre >8" dbh with >50% >25" dbh, mean 18". Burns 51.4 snags/ac.
****Pygmy nuthatch***	Territory 2-4 ac.	Prefer older, mature ponderosa stands but will forage in young stands. Target 10+ trees per acre of 21" dbh+, including 2 trees per acre >31" dbh. Secondary nester or primary excavator in snags or dead portions of live trees (8" dbh minimum, prefer 16"+ dbh). 1.4 snags/ac.
Green-tailed towhee	Territory 25 ac.	Open ponderosa pine forest with vigorous, diverse shrub understories. Clearcuts used.
Olive-sided flycatcher	Territory 35-100 ac.	Open forests with scattered tall trees and snags, along edges (especially high contrast with mature forest). Burned areas are important.
****Chipping sparrow***	Territory 3-7 ac.	Open forest with patches of regenerating trees or shrubs. Openings with forbs and grasses are important for foraging. Edges and clearcuts are utilized. Target 10-30% canopy cover, 20-60% shrub cover with >20% sapling cover, especially pines.
Mountain bluebird	Territory 5-15 ac.	Open forests, clear-cuts, edges of meadows, and burned areas. Secondary cavity nester (minimum 9" dbh). Burns 29.7 snags/ac.
Yellow-pine chipmunk	Home range <2.5-25 ac.	Open forests with shrub understories. Coarse woody debris is important, including stumps and logs, for nests (rocky areas also used). Seeds from trees and other plants are required. An important agent in the establishment of bitterbrush by caching seeds for food (Vander Wall, 1994).
Western fence lizard	Home range <2.5 ac.	Rocky rims, canyons, and hillsides with boulders. Require elevated perches and use stumps, logs, rocks, fences, etc. Great Basin subspecies in our area.

***Note**: *Focal Species for the Central Oregon Sub-province (Altman, 2000). Other principal references included Csuti et al. 2001; Johnson and O'Neil, 2001; Marshall et al. 2003; Thomas et al. 1979; and Marcot et al. 2003.*

Habitat Components & Elements— The following sections describe the principal habitat elements that the selected Indicator Species will require. Specific Desired Conditions for each species/group that are necessary to maintain viable local populations in the long-term are described in the section following each component/elements descriptions.

Snags/CWM Habitat Component: The following table was developed from the DecAID Advisor and shows future desired conditions for both large (i.e. 150 years+) and small-medium

ponderosa pine (i.e. 40-150 years) structural stages. The former is provided for comparative information, and the latter will be the basis for specific Desired Conditions for the project area. The attainment period for both stages would be subject to a variety of variables including: 1) reforestation success rate; 2) tree density; 3) tree mortality or damage agents; 4) competition with other trees and vegetation (i.e. growth rates); and 5) climate (precipitation, drought).

Table 4: DecAID General Desired Conditions for Snags and Down Wood

Habitat Type/Structure	Tolerance Levels	Snag Density	Snag Size (dbh)	Percent Cover Down Wood
Ponderosa Pine/Douglas-Fir (Large)	80% (north aspects, more productive sites)	13.3/ac. >10" dbh with 10.1/ac. >20" dbh. Increase numbers for pileated wp.	12-57 in.	3-4% (10-19.7" diameter range, 14" mean, with some to 45")
" "	50% (lower productivity areas)	6.5/ac. >10" dbh with 3.6 /ac. >20" dbh.	10-32 in.	1.8% (4.9-19.7" diameter range, 10" mean)
Ponderosa Pine/Douglas-Fir (Small-Medium)	50% (lower productivity areas)	2.7/ac. >10"dbh with 1.1/ac. >19.7" dbh. High density clumps in low fire risk areas that average to the above #s.	9.8-43 in.	1.4% (10" diameter mean with some larger)

Table 5 summarizes the individual elements for snags and coarse wood materials that can be reviewed for importance to individual indicator species. The summary after the table will provide specific Desired Conditions that have unique numbers, e..g. DC#1.

Table 5: Snags/CWM Elements

Indicator Species* (territory size)	Element Ratings**			
	Snag Density (minimum #/ac./DecAID data @ 50% level)/DecAID data @ 50% Post-fire***	Snag Size (minimum/mean dbh)***	Snag Arrangement (clumped, individual or mix)	Log Cover (minimum DecAID data for 1.4% per acre)
Flammulated owl (15-30 ac.)	1 (?/?/?)	1 (22"/24")	2 (mix)	3
Lewis' woodpecker (15 ac.)	1 (?/?/24.8 burns)	1 (12"/26")	1 (individual and small clumps)	2
Williamson's sapsucker (15 ac.)	1 (1.5/?/?)	1 (12"/21")	2 (mix)	2
Hairy woodpecker (25 ac.)	1 (1.6/?/41.8 burns	1 (10"/17")	2 (mix, edges)	2
White-headed woodpecker (20 ac.)	1 (1.4/6.4/51.4 burns)	1 (8"/26")	2 (individual)	2
Pygmy nuthatch (3 ac.)	1 (1.4/?/?)	1 (8"/18")	2 (mix)	2
Mountain bluebird (5-15 ac.)	1 (?/?/29.7 burns	1 (9")	1 (individual)	NA
Yellow-pine chipmunk	2	2	2 (individual)	2
Western fence lizard	NA	NA	NA	2

*Note: ***Italicized/bolded** species are Focal Species (Altman, 2000). **Rating codes—1 = required, 2 = used (not a critical parameter), 3 = indirect benefit (e.g. prey base uses), NA = not applicable, ? = no information. ***DecAID data from the ponderosa pine/Douglas-fir Open Vegetation Condition.*

In summary, the snag/cwm habitat component is critical to a significant majority of the Indicator Species. The individual species territories are subject to both intra- and inter-species competition. Therefore, the arrangement and numbers of snags must be designed so as to reduce competition across the landscape. A combination of individual and patches of snags/logs is recommended. The Desired Conditions for snag/log patches are as follows:

DC#1—Provide a minimum of 3 snags per acre as averaged for all snags in each salvage unit. In addition, retain 34 snags (10" dbh) and/or recent blowdown per acre to meet the log cover element of 1.4% per acre. Do not include un-salvaged areas outside of the units in computing the averages.

DC#2—At least 50% of the snags should be 10"-20" dbh and the balance of 50% of 21" dbh or greater. Logs should be a minimum of 10" in diameter and 40' long.

DC#3—Provide a mix of both individual snags and patches of snags across the salvage units. All snag/log patches and individuals should be no closer than 100 feet to an open, system road and be well distributed across each harvest unit. Areas of rocky lava outcrops may be selected for snags retention. Patches can range in size from ½-15 acres, and distributed across the project area at a rate necessary to meet the total minimum. For example, if a total of 370 snags (30+340) are needed on 10 acres to meet DC#1, then a ½ ac. patch with an average of 50 snags/ac. (reference Table 2) would need to be retained at the rate of 5 patches (2.5 acres) together with 120 snags/blowdown scattered across the remaining 8 acres. Patches with higher densities of suitable snags/blowdown would need less replication. The larger patches exceeding 5 acres should be strategically located.

Implementation of the Desired Conditions should take into consideration the observed distribution patterns of snags and logs that are cited in the DecAID Advisor. The recommended snag level as an example is an average derived from the various references. The data indicates that approximately 54% of the inventoried areas had no snags, while the balance of 46% had measurable snags >10" dbh. Therefore, retaining snags in patches is supported by the data. However, some species (e.g. Lewis' woodpecker) prefer individual snags in open areas, so having a mixed distribution of patches and individual snags meets more species' requirements. Species that utilize post-burn habitats have a higher snag requirement then they do in unburned forest. This is due to the lower levels of forage availability in recently burned areas. The snag levels indicated in Table 5 significantly exceed the level identified in the Desired Conditions for those species that prefer burned areas. However, the snags retained for future log inputs will provide adequate numbers for these species in the short-term. The effects analysis will also note the un-salvaged areas within the burn (i.e. 47% of the area) that will provide fully for these species.

Log retention also provides some flexibility. The referenced minimum of 34 logs in DC#1 is for only the 10" diameter size class. Given that a 10" log covers .041% of the ground, a 15" log covers .086%, and a 20" covers .152%, there is an opportunity to meet the total minimum percentage (i.e. 1.4%) with fewer logs using larger sizes. For example, a 10" log covers ~18 square feet and it would require 33.8 of them to meet the 610 square foot minimum. Leaving logs of 15" diameter (@ 37 square feet of coverage each) would only require 16.5 logs per acre. Logs of 20" diameter (@ 66 square feet of coverage each) would only require 9.2 per acre. These percentages are based on a log length of 40 feet. Fewer logs would be needed in the salvage area, which has snags on average exceeding the 40 foot length.

Green Tree Replacements (GTRs) Habitat Component: The majority of the project no longer has any green trees due to high mortality from the effects of the fire. However, the recognition of the importance of providing future green trees to continue the cycle of snags and logs for dependent species is critical. The site capability to produce trees of adequate size for dependent species is important as related to the stand density and subsequent ability to produce trees and future snags within a reasonable time period. The area is below 5000 feet in elevation and has low precipitation. The classified plant associations of the fire include in order of dominance: CP-S2-11 (ponderosa pine/bitterbrush/fescue) of moderate site productivity, CP-S2-17 (ponderosa pine/bitterbrush-manzanita/fescue) of poor site productivity, and CP-S2-13 (ponderosa pine/bitterbrush-manzanita/needlegrass) of low site productivity (Volland, 1988). The following Desired Condition is designed to address meeting the long-term objectives for the GTR habitat component (i.e. number of trees per acre for future snags and logs).

DC#4—Reforestation of the project area should provide and maintain 10-60 (average 35) large (i.e. >21" dbh) ponderosa pine per acre in order to meet future snag and log habitats. The natural patchiness of ponderosa pine forest should be replicated. The retention of all remaining green trees (GTRs) within the burned area will contribute to future snag recruitment goals.

Big Game Habitat Component: The most important elements for this habitat component are listed and rated for importance in the following table.

Table 6: Big Game Elements

Indicator Species	Element Ratings*				
	Hiding Cover	Thermal Cover	Travel Corridor	Forage	Solitude (Road/Trail Density maximums)
Mule deer (winter range)	1 (10%)	1 (30%)	1	1 (60%)	1 (1.0-2.5 mi./sq. mi.)
Mule deer (summer range)	1 (30%)	2	1	2	1 (2.5 mi./sq. mi.)

***Note**: * Rating codes— 1 = required by the LRMP, 2 = not required by the LRMP.*

In summary, the described elements are critical for the maintenance of the mule deer population in the area. The LRMP (reference page 4-58) and agreements with the Oregon Department of Fish and Wildlife direct that habitat for mule deer, and winter range in particular, will be monitored and enhanced where possible to meet specific herd objectives.

DC#5—Provide hiding cover on at least 10% of the winter range area and 30% of the summer range area in the mid-term (15+ years) by planting coniferous trees in strategic patches that are a minimum of 6 acres in size and 400 feet in width. Cover patches should be located at least 400 feet from open, system roads if possible. A seedling spacing of 15' x15' is recommended (200 trees/acre) or whatever is determined is necessary to meet hiding cover. Expected mortality, as an example, should be included in the density estimate. Hiding cover is defined as vegetation capable of hiding 90% of a deer at 200 feet. At a minimum it must be at least 5 feet in height. No thinning would be done for at least 15 years. In addition plant trees along roadsides to provide screening cover.

DC#6—Develop thermal cover (40% canopy and 30 feet tall; minimum 30% canopy and 15' tall) on at least 30% of the winter range area in the long-term (30+ years) by planting coniferous trees in strategic patches that are a minimum of 10 acres in size and 400 feet in width. Tree densities

should be adjusted to account for mortality, costs, etc. Thermal cover patches should be adjacent to forage areas and at least 400' from open, system roads.
DC#7—Develop travel corridors through the area where possible to reconnect with those adjacent to it from previous vegetation management projects. Plant coniferous trees in the designated corridors to attain hiding cover characteristics. The corridors must be a minimum of 600 feet in width. A seedling spacing of 15'x15' is recommended (200 trees/ac.). Higher densities may be needed if mortality is expected. No thinning would be done for at least 15 years. Acreages in corridors may be used to attain DC#4 provided that good spatial distribution of hiding cover is attained.
DC#8—Promote or maintain high quality forage areas on 60% of the winter range area. The forage areas should emphasize bitterbrush and forbs. Availability can be promoted by closing or restricting motorized access to the area and by not allowing any impediments to access or movement by deer through the area (e.g. fencing). All forage areas (i.e. patch centers) should be within 1200' of planned cover patches.
DC#9—Manage roads and motorized trails to meet the maximum allowable road densities in the respective portions of summer (2.5 mile per square mile) and winter ranges (1.0-2.5 mile per square mile). Restore decommissioned road prisms to native vegetation.

Forest Structure and Arrangement Habitat Component: The following table displays selected elements for this component and those Indicator Species that utilize them. The importance of each element is rated by species.

Table 7: Forest Structure and Arrangement Elements (long-term)

Indicator Species*	Element Ratings**						
	LOS Stage 6	**LOS Stage 7**	**Large Trees/ Snags/ Logs**	**Open Canopy**	**Closed Canopy/ Dense conifers**	**Shrubs/ Herb-aceous/ Openings**	**Edges/ Burns**
Mule deer	3	2 (forage)	NA	2 (forage)	2 (cover)	1 (forage)	2/2
Flammulated owl	2	1	1 (nests)	1	1 (nests, roosts)	1 (forage)	1/?
Lewis' woodpecker	3	1	1 (nests)	1	3	2 (forage)	2/1
Williamson's sapsucker	2	2	1 (nests)	1	3	NA	3/?
Hairy woodpecker	1 (winter)	1 (winter)	1 (nests)	1	3	NA	3/1
White-headed woodpecker	3	1	1 (nests, forage green)	1	3	2 (nests)	3/?
Pygmy nuthatch	1	1	1 (nests, forage)	2	2	NA	2/?
Green-tailed towhee	NA	2	NA	1	NA	1	1/?
Olive-sided flycatcher	2 (edge)	1 (edge, gaps)	1 (dead tops)	1	NA	2 (migration)	1/1
Chipping sparrow	3	2	NA	1	3	1 (grass preferred)	1 (grass edges)/?
Mountain bluebird	2 (juniper)	3	1 (second-ary)	1	NA	1	1/1
Yellow-pine chipmunk	3	2	2 (logs)	2	3	1	1/?

Western fence lizard	3	3	2 (logs)	2	NA	2	1/?

Notes: *Italicized/bolded *species are Focal Species for the Conservation Strategy for Landbirds of the East-Slope of the Cascade Mountains (Altman, 2000) for the ponderosa pine habitat type. **Rating codes—1 = primary, 2 = secondary, 3 = casual use, NA = not applicable or negative relationship, ? denotes unknown, no information found. Principal reference Marshall et al. 2003.*

In summary, the Indicator Species as a group require relatively open forest habitats. The majority require snags and several have a strong affinity to burned areas.

DC#10—Reforestation should mimic the natural patchiness of ponderosa pine forest and provide for future large tree habitat by keeping tree densities low. Dense patches should be strategically planned to meet the needs of mule deer, flammulated owls (nesting), and other species. The natural patch size in eastside ponderosa pine is 1.2 acres (Harrod et al. 1998). Openings should be frequent throughout the regenerated forest in order to provide herbaceous and shrub vegetation and vertical and horizontal diversity.
DC#11—Provide corridors via reforestation to reconnect LOS stands and OGMAs around the project. Note: There is one OGMA about one mile west of the project area.

Environmental Consequences (indirect, direct and cumulative)

Alternative Descriptions— Refer to the project environmental impact statement for a complete description of the alternatives and the environmental consequences. A Summary of Outputs by Alternative is in the Appendix of this report. Post-fire literature (e.g. McIver and Starr, 2000; Ambrose et al. 2003; Beschta et al. 1995) on salvage harvest was reviewed to further identify issues for evaluation.

Alternative 1 No Action: This alternative would leave the project area as it is post-fire. There would be no salvage harvest, reforestation plantings, or road closures. The area would be allowed to naturally restore itself. The establishment of coniferous trees would be slow and uneven. Grasses, forbs, and some shrub species should recover relatively quickly. However, they would compete with the natural conifer seedlings, and further extend the time of reforestation. Large amounts of dead and down trees would accumulate through time. This may benefit some species but potentially negatively affect some others, e.g. deer movement.

Alternative 2 Proposed Action: The proposed action would salvage harvest within a 1936 acre area of the fire, which had a gross acreage of 3810 acres. Approximately 8.5 million board feet of logs would be removed from 8 individual harvest units (refer to the Appendix map). Existing (~1.0 mile) and temporary roads (~2.5 miles) would be used in removing the material. No new, permanent roads would be constructed. After harvest, road/area closures to motorized vehicles would be implemented that would reduce the current density. Seven miles of existing roads would be obliterated. The area would be reforested after harvest with variable densities of tree planting with dense planting in pre-identified locations for deer cover, movement corridors, and roadside screens (refer to Outputs table in Appendix).

The following section on indirect and direct effects on the Indicator Species is based on these assumptions for Alternative 2: 1) the project areas will fence approximately 640 acres to exclude big game animals with one rectangular exclosure within Unit 1; 2) reforestation will provide winter range objectives of 40:60 cover to forage ratio on the larger salvage units (i.e. Units 1, 4, and 8); 3) reforestation in the non-cover areas will provide a tree density that will promote the growth of large individual trees at an average of 35 per acre in the long-term (excluding non-winter range areas, patches identified for future deer cover, the fenced exclosure, and snag/log

retention patches); 4) post-project road closures will reduce densities; and 5) the desired conditions for snags and logs will be met.

Alternative 3 Rehabilitation Action: This alternative would not do any salvage harvest. Reforestation would be done in the same way as for the Proposed Action. Road closures and obliteration would also be identical to the Proposed Action.

Indirect and Direct Effects— The effects on indicator species are addressed in the following discussion. The selected indicators are listed first and then followed by the remaining LRMP management indicator species (MIS). Refer to the individual alternative Worksheets (Tables A, B, and C) in the Appendix for supporting details. The biological information previously presented (i.e. Tables 1, 3, 5, 6, and 7) provide the foundation for the following determinations.

Mule deer (MIS):

Alt. 1—Overall a negative effect on deer because the area would reforest very slowly, which would be an undesirable rate of recovery of important hiding and thermal cover on winter range. The summer range portion of the project is small (68 acres) and the recovery of hiding cover less critical. Forage resources would be good as shrubs and forbs recovered, however the majority of forage areas are too far from existing cover for full utilization by deer (i.e. in excess of 600'; reference LRMP and Thomas et al. 1979). Retaining the existing road density would also be a negative effect on deer because the road density of 5.7 miles per square mile would reduce the solitude and ultimate utilization of the area by deer. This is particularly critical on the winter range portion of the project.

Alt. 2—This alternative would benefit mule deer, because the reforestation efforts would recover hiding and thermal cover more quickly. The strategic locations of cover patches and adjacent forage areas in Units 4 and 8 would also result in better utilization of the forage areas by deer. The fencing of a single block of 640 acres in Unit 1 to exclude deer and elk will enhance seedling survival. However, it would remove 17% of the area from foraging and somewhat restrict movement of animals through the area. The 200 trees per acre density will provide hiding cover and the 300 trees per acre density both hiding and thermal cover in the long-term (source P. Powers, project silviculturist, FVS data runs). The projected amounts of hiding cover in the mid- (hiding) to long-terms (thermal) are 34% for each in the project area (LRMP objectives of 10% hiding and 30% thermal cover). Removal of the dead material would facilitate deer movement through the area in the mid- to long-term (i.e. as the dead snags windthrow) and promote forage development and conifer seedling survival by allowing more light to reach the understory. Road density would be reduced to 1.9 miles per square mile from 3.6.

Alt. 3—Effects from this alternative would be similar to the Alternative 2. Accumulations of windblown snags may impede deer movement through the area and reduce understory production.

Flammulated owl:

Alt. 1—Development of an open forest structure would be significantly delayed without reforestation. Further, the development of future nesting snags (i.e. large size, unburned) would be retarded.

Alt. 2—Reforestation would promote a quicker recovery of forested habitats important to the owl, provided that an open forest canopy structure is attained. Patches of higher density canopy should be available (e.g. deer cover patches) for nesting. Salvage would not affect the owl as they are not known to use burned areas.

Alt. 3—Effects are similar to Alternative 2. Heavy accumulations of blowdown snags could adversely affect local areas by reducing conifer growth, which would have a minor adverse affect on long-term owl habitat.

Lewis' woodpecker (MIS, Focal Species):

Alt. 1—An abundance of burnt snags would be very favorable to this species. The delay in forest re-establishment (i.e. future snags) would be negative.

Alt. 2—Salvage harvest would reduce the number of snags below the level recommended by DecAID (i.e. Table 3), which is to retain >50% of burns un-salvaged. The adjacent un-salvaged burnt forest is 1801 acres or 47% of the fire area, which is very close to the DecAID recommendation. The within unit snag retention levels (i.e. 17 snags/logs >10" dbh per acre; source J. Schlaich, Project Team Leader) are less than the average recommended by DecAID (i.e. 25 snags per acre). Reforestation would be beneficial in the long-term, provided that an open canopied forest structure is attained.

Alt. 3—Snag levels would be the same as Alternative 1, and reforestation the same as Alternative 2. This alternative would be the most favorable for this species.

Williamson's sapsucker (MIS):

Alt. 1—Abundant snags would be a positive effect. The delay in forest re-establishment would be negative.

Alt. 2—Snag levels would be provided post-harvest at a level adequate for this species. Reforestation would be beneficial in the long-term, provided that an open canopied forest structure is attained.

Alt. 3—Effects are similar to Alternative 2, however snag levels would be higher.

Hairy woodpecker (MIS):

Alt. 1—An abundance of snags would be very favorable to this species. The delay in forest re-establishment would be negative.

Alt. 2— Snag levels would be provided post-harvest at a level that is less (i.e. 17 snags/logs >10" dbh per acre) than that recommended by DecAID (i.e. 41.8 snags per acre; Tables 3 and 5). The adjacent un-salvaged burnt forest (1801 acres; 47% of the fire area) together with the unit retention levels would, however, exceed the DecAID recommendation when combined. Reforestation would be beneficial in the long-term, provided that an open canopied forest structure is attained.

Alt. 3—Effects are similar to Alternative 2, however snag levels would be higher. This alternative would be most favorable to this species. Note: this species has been observed within the project area post-burn.

White-headed woodpecker (MIS, Focal Species):

Alt. 1—Abundant snags would be a positive effect. The delay in forest re-establishment would be negative and more pronounced for this species, which depends on green ponderosa pine for foraging.

Alt. 2—Snag levels would be provided post-harvest at a level (i.e. 17 snags/logs >10" dbh per acre) that is less than that recommended by DecAID (i.e. 51.4 snags per acre; Tables 3 and 5). The adjacent un-salvaged burnt forest (1801 acres; 47% of the fire area) together with the unit retention levels would mitigate the effects. Reforestation would be beneficial in the long-term, provided that an open canopied forest structure is attained.

Alt. 3—Effects are similar to Alternative 2, however snag levels would be higher. This alternative would be the most favorable for this species.

Pygmy nuthatch (Focal Species):

Alt. 1—Burnt snags may not be that beneficial, as this species primarily uses decayed green trees/soft snags that have existing cracks. The delay in forest re-establishment would be

negative and more pronounced for this species, which depends on large, green ponderosa pine for foraging.

Alt. 2—Snag levels would be provided post-harvest at a level adequate for this species. Reforestation would be beneficial in the long-term, provided that an open canopied forest structure is attained (i.e. to promote large trees).

Alt. 3—Effects are similar to Alternative 2.

Green-tailed towhee:

Alt. 1—Not reforesting the area would be beneficial, because shrubs would develop more fully, which are important to this species.

Alt. 2—Reforestation would be negative in the long-term where stocking levels are high. Low stocking and open areas with shrubs provided in an open canopied forest structure should maintain adequate habitat.

Alt. 3—Effects are similar to Alternative 2. Accumulations of windblown snags may reduce the understory development.

Olive-sided flycatcher:

Alt. 1—Perches for foraging would be provided in excess from burnt snags. Delays in forest establishment could negatively affect forage (insect) availability and long-term perch availability (e.g. dead topped green trees).

Alt. 2—Snags (perches) would be adequate for this species post-salvage. Reforestation would be beneficial in the long-term, provided that an open canopied forest structure is attained.

Alt. 3—Effects are similar to Alternative 2, but snag levels would be in excess of needs.

Chipping sparrow (Focal Species):

Alt. 1—The delay in forest establishment would be negative in the short-term but likely positive in the long-term for this species. The patchy, open canopied natural forest with extensive openings with shrubs and grasses would provide high quality habitat.

Alt. 2—Reforestation would establish suitable habitat sooner provided it incorporated an open canopied forest structure with openings.

Alt. 3—Effects similar to Alternative 2, but in the long-term the extensive blowdown of dead snags would likely reduce the understory productivity, which is important to this species.

Mountain bluebird:

Alt. 1—This species has a strong preference for open areas and burns. Snags would be in excess of needs.

Alt. 2— Snag levels would be provided post-harvest at a level (i.e. 17 snags/logs >10" dbh per acre) that is less than that recommended by DecAID (i.e. 29.7 snags per acre; Tables 3 and 5). The adjacent un-salvaged burnt forest (1801 acres; 47% of the fire area) would significantly contribute to snag levels. There would be generally positive effects in the short-term, but declining suitability as the forest is re-established. An open canopied forest structure with openings and snags would still likely provide some habitat value.

Alt. 3—Effects similar to Alternative 2, but snags would be in excess of needs.

Yellow-pine chipmunk:

Alt. 1—The habitat will slowly improve as forbs, grasses and shrubs become established. Logs will be provided in abundance but could negatively affect understory productivity (i.e. seeds) in the long-term.

Alt. 2—Reforestation that provides an open canopied forest structure with abundant logs will be beneficial to this species. An average of 14 logs 10"+ diameter per acre would be left within the salvage units.

Alt. 3—Effects similar to Alternative 2, except that heavy windthrow accumulations could reduce the understory productivity.

Western fence lizard:

Alt. 1—The habitat will slowly improve as forbs, grasses and shrubs become established. Logs will be provided in abundance but could negatively affect understory productivity (i.e. insects) in the long-term.

Alt. 2—Reforestation that provides an open canopied forest structure with abundant logs will be beneficial to this species. An average of 14 logs 10"+ diameter per acre would be left within the salavage units. Maintaining open forest conditions near rock outcrops would be important to this species.

Alt. 3—Effects similar to Alternative 2, except that heavy windthrow accumulations could reduce the understory productivity.

Bald eagle (MIS): Refer to the Biological Evaluation/Assessment for details.

Northern spotted owl (MIS): Refer to the Biological Evaluation/Assessment for details.

Golden eagle (MIS): No existing nesting habitat within the project area. Development of open canopied forest structure and large trees in the long-term may provide potential nesting habitat (Marshall et al. 2003). The action alternatives would promote reforestation and are, therefore, more beneficial than the no action alternative. Foraging habitat would exist for the short and mid-terms in all alternatives. Note: this species has been observed in the project area post-burn.

Red-tailed hawk (MIS): No existing nesting habitat within the project area. Development of open canopied forest structure and large trees in the long-term may provide potential nesting habitat (Marshall et al. 2003). The action alternatives would promote reforestation and are, therefore, more beneficial than the no action alternative. Foraging habitat would exist for the short and mid-terms in all alternatives.

Osprey (MIS): No habitat or occupancy in the project area. The nearest known use sites on national forest lands are on the Deschutes River south of Bend, which is about six miles west of the project. Osprey are also found at East and Paulina lakes approximately 12 miles south of the project.

Northern goshawk (MIS): No existing nesting or foraging habitat within the project area. Potential habitat identified by the Kelsey Project on Luna Butte has been seriously impacted by the fire. The nearest known nest site is about 1.5 miles southwest of the project. Development of LOS forest in the long-term may provide potential habitat (Marshall et al. 2003). The action alternatives would promote reforestation and are, therefore, more beneficial than the no action alternative. Refer to the Kelsey and Fuzzy Projects wildlife reports for details on pre-fire surveys in the vicinity.

Cooper's hawk (MIS): No existing nesting habitat within the project area. Potential habitat identified by the Kelsey Project on Luna Butte has been seriously impacted by the fire. Development of semi-open canopied (i.e. patchy) forest structure and medium sized trees in the long-term (i.e. 50-80 years) may provide potential nesting habitat (Marshall et al. 2003). The action alternatives would promote reforestation and are, therefore, more beneficial than the no action alternative. Foraging habitat would exist for the short and mid-terms in all alternatives, particularly after shrubs recover. Refer to the Kelsey and Fuzzy Projects wildlife reports for details on pre-fire surveys in the vicinity.

Sharp-shinned hawk (MIS): No existing nesting or foraging habitat within the project area. Potential habitat identified by the Kelsey Project on Luna Butte has been seriously impacted by the fire. Development of closed or semi-closed canopied forest structure with thickets of dense, young trees in the long-term may provide potential nesting habitat (Marshall et al. 2003). Foraging habitat would exist in the mid-term after a young forest is well established. The action alternatives would promote reforestation and are, therefore, more beneficial than the no action alternative for both nesting and foraging habitats. Refer to the Kelsey and Fuzzy Projects wildlife reports for details on pre-fire surveys in the vicinity.

Great gray owl (MIS): No habitat or occupancy in the project area. This species depends upon lodgepole pine forest habitat in proximity to meadows and other forest openings with good pocket gopher populations (Marshall et al. 2003).

Great blue heron (MIS): No habitat or occupancy in the project area. The nearest potential habitat on national forest lands is the Deschutes River approximately 6 miles west of the project.

Woodpeckers (MIS): Addressed by the previous ecological indicator species. The following are species not utilized as indicators, but included in the LRMP MIS category:

Black-backed woodpecker—this species has been observed in the project area post-fire. However, it is an opportunist and seeks out burned areas. Its normal habitat is closely associated with lodgepole pine with a preference for LOS stands. The action alternatives would have insignificant effects on the population viability of this species, because large numbers of snags would be retained, including substantial patches. The scale of the project is small in relation to the species' range. However, the other alternatives would be more beneficial, due to greater snag retention. Ponderosa pine is not their preferred habitat type (Marshall et al. 2003; Altman, 2000) but will be utilized after a stand replacement wildfire.
Northern three-toed woodpecker—this species is associated with higher elevation (over 4500' on the DNF) mixed conifer and lodgepole pine stands. It is closely associated with bark beetles (Marshall et al. 2003). The action alternatives would have no effect on this species, because it is normally absent from the area. Any future occupancy would likely be incidental and short-term in the pursuit of insects attracted to the area.
Pileated woodpecker—the pileated woodpecker is closely associated with higher elevation, dense, mesic mixed conifer stands and requires large diameter logs and snags (Marshall et al. 2003). The action alternatives would have no effect on this species, because it is normally absent from the area. It rarely uses pure ponderosa pine habitats. Any future occupancy would likely be incidental and short-term in the pursuit of insects attracted to the area.
Northern flicker—this species is a generalist that utilizes a wide variety of habitat types with a preference for open canopied forest and edges (Marshall et al. 2003). It is not dependent upon burns and would be adequately provided for by the snag retention measures in the Proposed Action alternative provided that some large diameter snags are retained.

Waterfowl (MIS): No habitat or occupancy in the project area. The nearest habitat on national forest lands is the Deschutes River about 6 miles west of the project.

Peregrine falcon (MIS): Refer to the Biological Evaluation/Assessment for details.

Wolverine (MIS): Refer to the Biological Evaluation/Assessment for details.

Elk (MIS):

Alt. 1—Effects similar to mule deer, except that dominance by grass species would be more beneficial.

Alt. 2—Effects similar to mule deer. Elk generally require larger cover patches and will benefit from the fenced reforested area after they regain access. However, the area is much more important to deer, as elk use is incidental.

Alt. 3—Effects similar to mule deer.

Pine (American) marten (MIS): No habitat or occupancy in the project area. There are no recorded observations sites in or near the project for marten. Marten generally use higher elevation lodgepole pine and mixed conifer habitat types with a preference for mesic, late successional forests. Heavy canopy cover is also important in marten habitat (Ruggiero et al. 1994). Alternatives 1 and 3 could potentially provide marginal marten habitat (i.e. movement habitat) in the long-term as windthrown snags create heavy ground cover and the forest recovers.

Townsend's big-eared bat (MIS): No roosting or maternity habitat (i.e. caves or lava tubes) in the project area. The nearest occupied site is Skeleton cave about 3.5 miles northeast of the project. There is some potential for foraging (flying insects) in areas of shrubs (e.g. bitterbrush). However, few shrubs survived the fire, and there are extensive shrub patches adjacent to the project boundary. Alternative 1 provides more shrubs in the long-term due to delays in reforestation.

Species Associated with Logs and Down Woody Debris (MIS): Addressed by the previous indicator species.

Species Associated with Various Plant Communities and Successional Stages (MIS): Addressed by the previous indicator species.

Species with Special or Unique Habitats (MIS): No special or unique habitats (e.g. caves, riparian zones, cliffs, talus, etc.) within the project area.

In summary for Alternative 1, the indicator species that prefer large, open areas with dominate coverage by grasses and shrubs will be positively affected by the this alternative. The winter range and its dependent mule deer would have ample forage, but the recovery of hiding and thermal cover would be slow. Species dependent upon more extensive forest cover and/or old growth forest structure would be negatively affected. This is due to the very slow development of the forest post-fire without reforestation. None of the indicator species would have their population viability affected by the No Action alternative. The project area represents a very small proportion of the range of the indicator species, and it does not provide any critical resources for their overall survival.

In summary for Alternative 2, those species requiring future LOS forest and open canopy forest conditions would be benefited by the reforestation actions in this alternative. The required levels of snags and logs will meet most species' needs. However, a few that specialize in the use of burned areas with moderate to large volumes of dead (e.g. white-headed woodpecker, Lewis' woodpecker) would have less benefit due to the salvage removals. Non-salvaged areas outside of the project area (47% of the fire area with an average of 19.2 snags/ac.) and inclusions within it (i.e. 5% of larger units plus scattered individual snags) would mitigate the reduction in snags. Within the moderate/high intensity burn areas (i.e. stand replacement), 411 acres (17% of the gross 2420 acres) would not be salvaged. Finally, the literature cited in the strategy for east-slope landbirds, clearly documents that the primary limitation to the white-headed woodpecker is the loss of LOS ponderosa pine habitat, not access to burned areas. The primary impact on the

Lewis' woodpecker on the east-slope has been the suppression of low intensity wildfires and the loss of single-story LOS stands that were created and maintained by fire.

It should also be noted that leaving extensive areas of burnt snags may negatively affect some species. Haggard and Gaines (2001) documented that salvage projects which retained a moderate level of snags (i.e. 5.8 to 13.5 per acre) had the highest abundance, species richness, and nesting population of cavity nesters. The planned retention level for snags/logs in this alternative is 17 per acre, which is equivalent to the "high" level assessed in the above study (i.e. 14.2 to 30.8 per acre). The Proposed Action alternative would have a mix of individual and patches of snags which should provide for a moderate level of snag dependent species abundance and richness. As snags blow down the habitat should become increasing more open, which would further enhance its value to more species. None of the indicator species would have their population viability affected by the Proposed Action alternative. The project area represents a very small proportion of the range of the indicator species, and it does not provide any critical resources for their overall survival.

The construction and use of temporary roads (i.e. ~1 mile of existing and 2.5 miles of new) would not adversely affect any species other than by short-term displacement. Re-vegetation of the roads with native species would eliminate any mid- or long-term impacts. Connectivity would be restored in the long-term by reforestation. Fragmentation would be also be reduced by reforestation. The salvage of dead trees and retention of green within and adjacent to the project would not significantly increase fragmentation. The destruction of the green forested canopy by the fire has already caused the fragmentation.

This alternative would generally have positive effects on the winter range, because the long-term objective of providing a 40:60 cover to forage ratio would be attained more quickly than in the other alternatives. The use of fencing to exclude deer and elk from the 640 acre plantation in Unit 1 would have a short-term negative affect, because the animals would be denied access to potential forage areas. The trade-off is that the elimination of browsing on seedlings will enhance their survival and growth rates.

In summary for Alternative 3, the effects are beneficial for those species requiring both high numbers of snags and an open canopied forest structure. The Lewis', white-headed and hairy woodpeckers for example would benefit from these conditions. Other species dependent upon an open, productive understory of forbs, grasses and shrubs could be negatively affected in the long-term as heavy accumulations of windthrown snags cover the ground. In the case of mule deer, their movements could
be restricted. None of the indicator species would have their population viability affected by the Rehabilitation Action alternative. The project area represents a very small proportion of the range of the indicator species, and it does not provide any critical resources for their overall survival.

Cumulative Effects— Cumulative effects of the No Action alternative include: 1) Additional stand replacement fire acreage when totaled with the other fires in the vicinity (i.e. Horse Butte, Bessie Butte, Sundance, Cabin, Horse Ridge, Evans West, and Skeleton). These are likely significant impacts on local mule deer herds because of the additional reduction of forage, hiding and thermal cover on winter range. In addition, the long recovery period for areas that are not fully reforested (e.g. Skeleton fire) will further delay the attainment of LOS forest habitats over a large area. 2) The eventual accumulation of large amounts of down and dead material in the area may be a risk to future high intensity wildfires, which could potentially seriously impact the soil

resources (i.e. heavy log sized fuels on the ground) and further delay the establishment of a functioning forest.

The Proposed Action alternative would mitigate the loss of deer cover in the area by reforestation. However, the benefits would at best be in the mid-term (i.e. 15+ years). In general, deer thermal cover in the area is below management objectives (Keown and Webb, 2004). Road closures would contribute to reducing the cumulative effects from roads in this general area, which are in excess of desired conditions as specified by the LRMP. Reducing the volume of woody debris by salvaging would reduce the probability of future high intensity wildfires, which could impact an area much larger than the project. It would also facilitate the movement of deer and elk through the area. The salvage logging would whole tree yard all the harvest trees which would greatly reduce potential post-logging fuel accumulations.

The cumulative effects of the Proposed Action on MIS are as follows: 1) those species requiring open canopied forest structure would benefit because the forest would be re-established more quickly. Further, maintaining 60% of the area in relatively low tree densities (i.e. deer forage areas) would also benefit this group; 2) species requiring heavy canopied, multi-stratum LOS habitat would not be adversely affected, because the low site productivity of the area likely precludes developing this type of habitat; and 3) cavity dependent species would be provided for by the planned retention levels of snags. Lewis', hairy and white-headed woodpeckers which utilize burned areas, would have sufficient snag levels post-salvage with the combination of un-salvaged areas of the fire (i.e. 47%) and within unit snag/log retention levels. The size of the project is very small compared to the regional distribution of all of the indicator species, so the effects are primarily local. Further, it is not the preferred habitat type of several MIS (e.g. black-backed woodpecker), which may use the area temporarily. Indicator species with declining populations have a number of factors affecting them. The Proposed Action mitigates potential adverse effects to the indicators and has positive effects through reforestation actions. The long-term impacts of the fire will cause a deficit in snag habitat for all dependent species within approximately 25 years, because the existing snags will have fallen prior to recruitment from the re-established forest (Harrod et al. 1998). The Proposed Action would reduce the time period of the deficit. This effect is aggravated by the low snags levels common in the surrounding un-burnt forest area (Keown and Webb, 2004).

The Rehabilitation Action alternative would have affects in common to both previous alternatives including the accumulation of large amounts of down and dead material (negative), the restoration of forested habitats (positive), and road closures (positive). The reforestation investments could potentially be lost to future catastrophic wildfire due to heavy fuels accumulations, which would further delay providing open canopied forested habitats for many indicator species.

Cumulative and future effects common to all the alternatives include:

- Increased natural fuel loadings and risk of future wildfire. The duration of this risk is unknown, but likely extend to the long-term (i.e. 50+ years).
- Increased probability of insect attacks on residual and adjacent green trees due to the attraction to standing and down snags. The magnitude and duration of this effect are unknown.
- Past prescribed burns, wildfires, and timber harvest areas (10-20 years old) where bitterbrush and deer cover have not fully recovered.
- The Fuzzy Project (implementation) has affected deer cover and movement corridors, forage (i.e. bitterbrush), forested habitats, road densities, etc. There is a minor overlap of

the two projects. Most negative effects from the Fuzzy Project were mitigated via the environmental assessment, but it was predicted that the North Paulina deer herd would be reduced (Becker, 2000).

- The future Kelsey Project will be affecting deer cover and movement corridors, forage, forested habitats, road densities, etc., and it overlaps most of the salvage project. The environmental assessment is currently being revised to account for the cumulative affects of the 18 Fire and planned Kelsey activities. The 18 Fire Project does not add to the effects on deer hiding/thermal cover or raptor habitat as examples, because the fire eliminated these habitats. In fact, alternatives that include reforestation will facilitate the recovery of these habitats.
- The cumulative effects (i.e. hiding and thermal cover) of past (Fuzzy) and future (Opine, Kelsey, 18 Salvage, and Aspen) projects on Deer Habitat Management Area (MA 7) overlapping the North Paulina Deer Herd area are as follows: Kelsey hiding @ 23%, thermal @ 24%; Fuzzy hiding @ 11%, thermal @ ~4%; Opine @ 9.6% hiding, 2.5% thermal; and 18 Salvage @ 0% hiding, 0% thermal. Collectively the projects will result in 11% hiding cover (LRMP objective of 10%) and ~8% thermal cover (LRMP objective of 30%) across MA 7 for the North Paulina deer herd.
- The current 18 Fire Road Salvage Project is removing snags from a narrow strip along the major roads through the fire area (73 acres). It is not expected to contribute to cumulative effects on snag dependent species due to the limited area impacted. Further, a minimum of 3 snags per acre together with green-tree-retention will mitigate the salvage effects on indicator species.
- Existing roads, motorized trails, gas line corridor, gravel pits, etc. are throughout the surrounding area. The Proposed Action alternative will only add temporary road impacts, which will be of short duration and of minor magnitude to the wildlife resources of the project area. Post-project road closures will reduce the current density of 3.6 to 1.9 miles per square mile.

There are no private lands or BLM administered lands adjacent to the project area that would have a significant contribution to the cumulative effects of this project. There is no current active livestock grazing in the project area that would contribute to cumulative effects. Active grazing by sheep and goats may occur within two years. Cumulative effects from the grazing are not expected, provided that utilization standards are met.

Summary of Applicable Project Design Criteria (PDC) and Mitigation Measures (MM)

The following items are noted in order to meet existing direction and/or to meet the previously described Desired Conditions. Reference the environmental impact statement for the final determinations on the incorporation of the PDCs and MMs into the project.

PDCs— Project Design Criteria are generally required LRMP Standards and Guidelines (S&Gs) and Eastside Screens standards. Desired Conditions (DCs) that would be met by the PDCs will be referenced in brackets.

Management Area 7 (Deer Habitat):

***PDC 1*:** Restrictions on motorized and OHV recreation could be implemented on a seasonal basis between December 1 and March 31 and during hunting seasons (M7-1).

PDC 2: Vegetation will be managed to provide optimum habitat considering the inherent productivity of the land. …with cover making up 40 percent of the land area. Approximately three-
quarters of cover areas should be thermal cover with the remainder in hiding areas (theme and objectives). [DC #5, #6]

PDC 3: Habitat management will be designed to provide a mosaic of forested conditions which incorporates the concepts of escape and hiding cover, thermal cover, travel corridors, visual screens, and harassment potential. (M7-10). [DC #5, #6, #7]

PDC 4: Forage conditions will be maintained or improved with emphasis on increasing the variety of plants available for forage and a mixture of age classes of shrubs (M7-14). [DC #8]

PDC 5: Target open road densities shall average 1.0-2.5 miles per square mile in each Implementation Unit…(M7-22). [DC #9]

Forest-Wide Standards and Guidelines/Eastside Screens Standards:

PDC 6: Biological diversity is considered of primary importance to wildlife species. Deer, elk, woodpeckers, and songbirds are species which can serve as indicators of the maintenance of biological diversity. Management activities should be tailored to provide habitat diversity including horizontal,
vertical and vegetative species diversity necessary for the maintenance of these wildlife species at the appropriate population levels established in the standards/guidelines (TM-55). [DC #10]

PDC 7: Horizontal diversity is of primary importance to deer and elk. Forage/cover ratios are one measure of this diversity (TM-57). [DC #5, #6, #10]

PDC 8: Vertical diversity is of primary importance to cavity dependent wildlife species as well as songbirds which require a variety of tree sizes for nesting, perching, and feeding. Vertical structural diversity can best be maintained with uneven-aged management and it is the preferred prescription to meet this objective (TM-62). [DC #10]

PDC 9: Active nest sites (golden eagles, redtail hawk, Cooper's hawk, sharp-shinned hawk) should be protected from disturbing activities within ¼ mile of the nest by restricting site disturbing operations during the period of: February 1-July 31: Golden eagle, March 1-August 31: Redtail hawk, April 15-August 31: Cooper's and Sharp-shinned hawks (WL-3, 19, 28).

PDC 10: In coniferous forest, sufficient snags will be maintained to provide 40 percent of potential population levels of cavity nesting species…live replacement trees (i.e. GTRs) will be left during any harvest to assure 60 percent of cavity nesting potential. Specific guidelines will be provided by the Deschutes National Forest Wildlife Tree Implementation Plan (WL-37, 38). The Eastside Screens specify that 100 percent of cavity nesting potential will be provided with snags and green tree retention (however, "salvage" sales are exempted). Reference the preceding Desired Conditions which incorporate the latest scientific findings, which require a minimum of 3 snags per acre and retention of the remaining green trees. [DC #1, #2, #3]

PDC 11: Deer summer range—Target open road densities are 2.5 miles per square mile… (WL-53). [DC #9]

PDC 12: Deer summer range—Hiding areas must be present over at least 30 percent of National Forest land in each implementation unit. Six acres or larger stand with an average height of 6 feet and which has not been thinned in 15 years (WL-54). [DC #5]

PDC 13: Deer summer range—Travel corridors will be provided…. (WL-56). [DC #7]

PDC 14: Deer summer range—If possible, a narrow strip of trees should be left along roads to reduce view distances (WL-58). [DC #5]

PDC 15: Fallen trees and other woody debris will be retained in sufficient quantity, distribution, and physical characteristics to provide habitat for viable populations of dependent wildlife species over time (WL-72, 73). The Eastside Screens require 3-6 logs of 12" diameter (small end) per acre (however, "salvage" sales are exempted). Reference the preceding Desired

Conditions which incorporate the latest scientific findings, which require a minimum of 1.4% of CWD coverage per acre. [DC #1, #2, #3]

PDC 16: Diversity will be provided by having various successional stages represented in an area through time. Large homogeneous areas of the same species and/or successional stages will be avoided (WL-74). [DC #10]

PDC 17: Provide connectivity between LOS stands and designated Old Growth Management Areas (Eastside Screens standard). Reference the preceding Desired Conditions for deer cover and the Implementation Guidelines in the Appendix in order to plan the cover patches in conjunction with the long-term corridor objectives. [DC #11]

PDC 18: Maintain open, park like stand conditions where this condition occurred historically. Manipulate vegetation in a manner to encourage the development of large diameter, open canopy structure (Eastside Screens standard). [DC #10]

PDC 19: In preferred forest types, concentrations of down woody material (logging slash, cull logs, fallen trees, etc.) will be left at an average rate of approximately one per acre after any timber harvest (WL-63, 73). [DC #1, #3]

MMs— Mitigation measures are those that are recommended to the interdisciplinary team and line officer that are necessary to maintain or protect wildlife resources. They are site specific and may exceed or augment the PDCs.

MM1: Harvest, road building, hauling and other disturbing activities within the deer winter range area are prohibited from December 1-March 31 each year. If winter time activities are necessary in order to mitigate the impacts on other resources (e.g. logging on snow/frozen ground to reduce soil compaction) then the contract should be as short as possible. Avoid logging when the area is being heavily used or crossed by migrating deer. Generally, early logging in the winter is preferable to later periods. However, heavy snowfalls may move wintering deer out of the area due to a lack of coniferous canopy.

MM2: Restrict motorized vehicle access (including OHVs and snowmobiles) to designated routes year-around. Prohibit all off-road travel in the project area.

MM3: Reforestation will plant ponderosa pine within pre-determined deer hiding/thermal cover patches, movement corridors, and roadside screens to meet the long-term Desired Conditions. A maximum of 40% of the winter range area would be planted for this objective. Refer to the Implementation Guidelines in the Appendix for details. Vexar tubes, vegetation matting or fertilization may be employed within cover, corridor and screen patches to promote survival and growth.

MM4: Reforestation will plant ponderosa pine on deer forage areas (i.e 60% of project area) in a variable spacing of individual trees, patches of trees, and openings. The objective is to emulate a natural mosaic of open canopied pine forest and produce and maintain an average of 35 large diameter (i.e. 21"+ dbh) ponderosa pine trees per acre. Patch size should average 1.2 acres (Harrod et al. 1998). The estimated number of trees to achieve these objectives should be determined by considering site factors of productivity, vegetation competition, and other site characteristics. The use of vexar tubes to reduce animal damage is acceptable. Vegetation control matting or fertilization may also be used on 50% of these trees to promote growth rates. The other trees above the minimum objectives should not have vegetation control or fertilization, in order to produce a stand with variable canopy heights. Refer to the Implementation Guidelines in the Appendix for additional details.

MM5: Animal damage control, including gopher baiting/trapping, will only be done on a local-scale as needed to achieve the preceding reforestation objectives. Treatment area locations, timing, and methodology would be coordinated between wildlife and silviculture operations personnel. Coordinated monitoring will be done to document the results and needs for any future actions. Also, reference the PDC in the BE/BA relating to using poison for pocket gopher control.

MM6: Fencing done in the winter range area will be done in a manner that will maintain access to at least minimal forage resources by deer and elk and to allow free movement of animals through the winter range.

MM7: Established cover patches will not be thinned for a minimum of 15 years. Patches will be monitored 5 years after planting and replanted as necessary to meet cover objectives.

MM8: Retain all non-commercial trees (including whips) that do not exceed the maximum allowable amounts of fuels in order to provide some hiding cover for deer and reduce potential illegal off-road access.

MM9: Re-vegetate closed/decommissioned road beds with native shrubs, forbs, grasses and trees.

MM10: Restrict salvage logging activities (falling) during the nesting season of migratory birds from March 15-July 30. Migrants include species that use ground cover (i.e. unburnt shrub islands), residual green trees, and snags. A waiver could be granted provided that a nesting survey of the area was conducted which confirmed that there would be no significant adverse impacts on migratory birds.

MM11: Avoid impacting existing un-burnt "islands" of shrubs with salvage activities.

MM12: Post the area as closed to any type of firewood cutting.

Project Analysis Conclusions

The 18 Fire Salvage Project offers opportunities to restore the area more quickly to provide habitats for a variety of species. Open canopied forest structure that provides large ponderosa pine and a productive understory of herbaceous and shrub species would emulate the historic habitat type found in the area. Frequent, low intensity fires of the past created a patchy, mosaic of trees and openings that were favorable
to most of the indicator species assessed by this report. The past processes also provided a steady recruitment of large diameter snags. Fire suppression has altered the natural occurrence of frequent, low intensity fires, which has resulted in stand replacement fires such as the 18 fire. Pulses of snags post-crown fire eventually fall (i.e. within 40 years and most down in 25 years), and the replacement forest will have had inadequate time to recruit snags (i.e. 80-110 years is needed), other than small diameter ones (Harrod et al. 1998). Modeling (source P. Powers, project silviculturist) suggests that only 1.2 to 1.7 snags (>12" dbh) per acre will still be standing in 2025. The re-establishment of the forest by planting would decrease the time gap for snag recruitment as well as provide forested habitats for other species sooner. However, establishing a uniform, dense plantation of trees over a large area would not be conducive to meeting the requirements of the indicator species assessed in this report.

Research has suggested that for cavity nesters that forage primarily on standing trees, that logging practices that remove a large portion of standing fire-killed trees may have particularly detrimental effects. Such effects are not likely to be mitigated simply by leaving a few trees as nesting substrates. Most tree-foraging cavity nesters are excavators that create nest holes used by other species. Their low numbers may ultimately contribute to lower densities of non-excavating species (Caton, 1996). The combination of leaving individual snags, patches of snags, and large areas of un-salvaged burn should provide for the variety of individual species needs. Further, fire damaged green trees that will not be salvaged, have a relatively high probability of dying later from drought, insect or disease. These trees will also contribute to future wildlife needs.

The effects on mule deer cover by the Proposed Action have been modeled through time (source P. Powers, project silviculurist). It is estimated that tree plantings of 200 trees per acre will provide about 16% crown cover in 40 years and 34% in 100 years. Plantings of 300 trees per acre would provide about 21% crown cover in 40 years and 36% in 100 years. Of the 1868 acres of

winter range within the salvaged portion of the fire, 530 acres (i.e. Unit 1, 5 and 7) would be planted at 200 trees per acre and 179 acres (i.e. Units 1, 4 and 8) would be planted at 300 trees per acre. Units 1, 4 and 8 are within winter range and 5 and 7 in General Forest (i.e. summer range). Thus, the modeling would suggest that thermal cover would be developed on approximately 641 acres (i.e. 30%+ canopy cover) of winter range or 34% of the area after about 100 years. Also, assuming that both tree planting densities would provide hiding cover would give the same percentage on winter range, and 100% on the two summer range units. However, hiding cover is transitory and diminishes as the trees grow in height and branches on the lower bole die back. The remainder of the plantings on 1227 acres (Units 1, 2, 3, 4, 6, and 8; 66% of the winter range) would be at 50 trees per acre, which would not provide any hiding or thermal cover but should provide high quality forage areas. The above acreages are gross and include the 5% of Units 1, 4 and 8 (gross acreage 1789 acres; net 89 acres) retained for snag/log patches that would not be planted. In summary, the winter range objective of 40:60 cover to forage ratio with 10% hiding cover and 30% thermal cover should nearly be met in the long-term. The spatial distribution could be better, but planting with fencing should be more successful and economical than with other protection methods.

Allowing the area to naturally recover has some advantages but also some negative effects as documented in the analysis. Providing dense snag patches to those species that favor burned forest is probably the most significant challenge for the project. The combination of within unit retention patches, individual retention snags, and the adjacent un-salvaged burnt areas, which are 47% of the fire area, should adequately provide for most species.

Monitoring Recommendations

Both implementation and effectiveness monitoring are recommended for the Proposed Action and Restoration alternatives for this project. The following objectives are suggested:

- Document the mortality of planted trees by falling snags, gophers, browsing, etc.
- Determine the snag use by wildlife post-salvage for at least 2 years (Bate, 1995; Dudley and Saab, 2003).
- Monitor the success of road/area motorized vehicle closures, including the effectiveness of enforcement actions. Adjust tactics in a timely fashion to address problems.
- Document the effectiveness of the plantation fence in restricting big game access.
- Install strategically located photo points to document the recovery of the area.

For the No Action alternative:

- Monitor the use of the area by mule deer.
- Determine the snag use by wildlife post-salvage for at least 2 years (Bate, 1995).
- Install strategically located photo points to document the recovery of the area.

Knutsen-Vandenberg Projects

The following K-V projects are planned for the project area:

- Reforestation including fencing to exclude big game species.
- Road closures (barriers, native plantings)
- Road decommissioning (ripping, native planting)

These activities will not adversely affect the wildlife species analyzed in this report and should be of benefit to them provided that the applicable PDCs and MMs are met.

Appendix

Table A: No Action Effects (Worksheet)

Indicator Species	Effects on Habitat Elements*							
	Snags/ Logs	**Soli-tude**	**LOS**	**Large Trees**	**Open Canopy**	**Closed Canopy**	**Openings /Edges**	**Notes**
Mule deer	NA	-	0	NA	+	--	+	Cover would establish very slowly.
Flammulated owl	+	NA	-	-	+	-	+	
Lewis' woodpecker	++	NA	-	-	+	NA	+	Prefers burns.
Williamson's sapsucker	+	NA	-	0	+	NA	NA	
Hairy woodpecker	+	NA	-	0	+	NA	+	Uses burns.
White-headed woodpecker	+	NA	--	--	+	NA	+	
Pygmy nuthatch	+	NA	-	--	-	-	NA	
Green-tailed towhee	NA	NA	NA	NA	+	NA	++	
Olive-sided flycatcher	+	NA	-	-	+	NA	+	Uses burns.
Chipping sparrow	NA	NA	-	NA	+	0	++	
Mountain bluebird	+	NA	NA	0	+	NA	+	Uses burns.
Yellow-pine chipmunk	+	NA	NA	-	+	NA	++	
Western fence lizard	+	NA	NA	-	+	NA	+	

***Note**: Effects ratings as follows: ++ very positive, + positive, 0 neutral, - negative, -- very negative, NA not applicable or unknown.*

Table B: Proposed Action Effects (Worksheet)

Indicator Species	Effects on Habitat Elements*							
	Snags/ Logs	**Soli-tude**	**LOS**	**Large Trees**	**Open Canopy**	**Closed Canopy**	**Openings /Edges**	**Notes**
Mule deer	NA	+	+ (SS7)	NA	+ (forage areas)	+ (cover areas)	+ (forage, within 600' of cover)	Cover would be established in the mid-term.
Flammulated owl	+	NA	+	+	+	+ (nesting patches)	+ (forage areas)	
Lewis' woodpecker	- to +	NA	+	+	+	NA	+ (forage areas)	Prefers burns.
Williamson's sapsucker	+	NA	+	0	+	NA	na	
Hairy woodpecker	+	NA	+	0	+	NA	+	Uses burns.
White-headed woodpecker	+	NA	+	+	+	NA	+	

Pygmy nuthatch	+	NA	+	+	+	+	NA	
Green-tailed towhee	NA	NA	NA	NA	+	NA	++	
Olive-sided flycatcher	+	NA	+	+	+	NA	+	Uses burns.
Chipping sparrow	NA	NA	+	NA	+	0	+	
Mountain bluebird	+	NA	NA	0	+	NA	+	Uses burns.
Yellow-pine chipmunk	+	NA	NA	+	+	NA	+	
Western fence lizard	+	NA	NA	+	+	NA	+	

***Note**: Effects ratings as follows: ++ very positive, + positive, 0 neutral, - negative, -- very negative, NA not applicable or unknown.*

Table C: Rehabilitation Action Effects (Worksheet)

Indicator Species	**Effects on Habitat Elements***							
	Snags/ Logs	**Soli-tude**	**LOS**	**Large Trees**	**Open Canopy**	**Closed Canopy**	**Openings /Edges**	**Notes**
Mule deer	NA	+	+ (SS7)	NA	+ (forage areas)	+ (cover areas)	+ (forage, within 600' of cover)	Cover would be established in the mid-term.
Flammulated owl	+	NA	+	+	+	+ (nesting patches)	+ (forage areas)	
Lewis' woodpecker	++	NA	+	+	+	NA	+ (forage areas)	Prefers burns.
Williamson's sapsucker	+	NA	+	0	+	NA	NA	
Hairy woodpecker	+	NA	+	0	+	NA	+	Uses burns.
White-headed woodpecker	+	NA	+	+	+	NA	+	
Pygmy nuthatch	+	NA	+	+	+	+	NA	
Green-tailed towhee	NA	NA	NA	NA	+	NA	++	
Olive-sided flycatcher	+	NA	+	+	+	NA	+	Uses burns.
Chipping sparrow	NA	NA	+	NA	+	0	+	
Mountain bluebird	+	NA	NA	0	+	NA	+	Uses burns.
Yellow-pine chipmunk	+	NA	NA	+	+	NA	+	
Western fence lizard	+	NA	NA	+	+	NA	+	

***Note**: Effects ratings as follows: ++ very positive, + positive, 0 neutral, - negative, -- very negative, NA not applicable or unknown.*

Biological Evaluation
Threatened, Endangered, Proposed, and Sensitive Plants

18 FIRE SALVAGE PROJECT

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* *

SUMMARY OF FINDINGS

The analysis of effects on species viability found the following:

For the No Action alternative:
There are no expected impacts to PETS plant species with the implementation of this alternative.

For the two action alternatives:
There are no expected impacts to PETS plant species with the implementation of this alternative.

INTRODUCTION

This Biological Evaluation documents the review and review findings of Forest Service planned programs and activities for possible effects on species (1) listed or proposed for listing by the USDI Fish and Wildlife Service (USFWS) as Endangered or Threatened; (2) designated by the Pacific Northwest Regional Forester as Sensitive. It is prepared in compliance with the requirements of Forest Service Manual (FSM) 2630.3, FSM 2672.4, FSM 10/89 R-6 Supplement 47 2670.44, and the Endangered Species Act (ESA) of 1973 (Subpart B; 402.12, Section 7 Consultation).

Proposed, Endangered, Threatened, or Sensitive (PETS) species considered in this evaluation are those listed in FSM 2670.4 Region 6 list dated April 1999 as suspected or documented to occur on the Deschutes National Forest. Listed plant species and their listing status are in Appendix A.

This document is organized as follows:

1.PROPOSED ACTION AND ALTERNATIVES--Description of the project and its alternatives

2.EVALUATION--Evaluation of effects on listed plant species

3.RECOMMENDATIONS--Recommendations to minimize minor effects on non-Federally listed Sensitive species viability

4.COMMUNICATION--Communication with personnel during the evaluation

5.REFERENCES--Documents referred to during the evaluation

6.APPENDICES--Appendices of sensitive species that are suspected to occur on the Bend/Ft. Rock Ranger District, and habitat descriptions of species suspected to occur within the project area

NO ACTION ALTERNATIVE

Under the No Action alternative, current management plans would continue to guide management of the project area. Separate resource recovery projects (#1: Hazard tree and salvage removal from 73 acres adjacent to the 18, 9711 & 1810 roads at a 100-foot distance from the road. Fifty trees or less may eventually fall after this roadside salvage; #2: Road management –the area will be closed to the public for an indefinite period of time [typically two-three years] except for the 18, 1810 roads; #3: Reforestation of the 73 acres adjacent to the roads within the roadside removal; #4: Weed treatment -- the Burned Area Emergency Rehabilitation report identified the need to monitor & treat noxious weeds) would not be affected with the selection of this (or any other) alternative.

Salvage Harvest – No Action Alternative

No salvage activities or timber harvest would result from this alternative.

Hazard trees – No Action Alternative

Trees that pose a hazard to public safety on open roads would continue to be monitored and felled when identified as a hazard according to the Region Six Hazard Tree standard (Harvey, Jr. & Hessburg, Sr., 1992). Utilization of felled trees for commercial use would not occur under this alternative.

Snags and Down Wood – No Action Alternative

Under the No Action alternative existing snag levels would remain. No treatments are planned that would affect snags or down wood.

Table 2.5-1 Existing dead tree numbers for the 2420 acres of stand replacement

Size Class (diameter in inches-dbh)	Existing Dead Trees/Acre	Future Percent Cover Down Wood (>10" large end diameter)
4-7.5"	14.6	0
7.51-10.5"	19.1	1.4
10.51-13.5"	21.0	2.2
13.51-16.5"	13.5	2.0
16.51-19.50"	5.7	1.1
19.51"+	4.5	1.4
Total	78.4	8.1 percent

Forest Roads – No Action Alternative
No new roads would be constructed. The existing open road density for the 3,810-acre fire area would remain at 5.73 miles per square mile. Of this total, 4.44 miles of open road per square mile is comprised of tertiary roads and 1.29 miles per square mile consists of arterial and collector roads such as roads 18, 1810, 9711, 9714.

Reforestation – No Action Alternative
Reforestation would be limited to 73 acres previously approved, adjacent to roads 18, 1810 and 9711.

Subsoiling – No Action Alternative
No subsoiling would occur under this alternative.

PROPOSED ACTION (Alternative 2)

Objective – Proposed Action Alternative
This alternative is the proposed action. Proposed activities were designed to meet the purpose of and need for action as described in Chapter 1 and are consistent with existing Forest Plan direction. Map 1, at the end of this chapter, displays proposed timber harvest.

Salvage harvest - Proposed Action Alternative
With the implementation of Alternative 2, salvage would remove dead trees on approximately 1,936 acres. Minimum diameter of salvaged trees would generally be 12 inches for ponderosa pine. Only dead trees with no green needles would be removed. An estimated total volume of 8.5 million board feet (MMBF) would be salvaged under this alternative *(Table 2.6-1)* with ground based harvest systems.

Table 2.6-1 Alternative 2 salvage acres by LRMP Management Area

Unit Number	Acres Salvaged Alternative 2	LRMP Management Area	Percent of LRMP Management Area in fire Salvaged
1	1539	Deer Habitat	53
2	27	Deer Habitat	1
3	23	Deer Habitat	1
4	142	Deer Habitat	5
5	34	General Forest	3
6	29	Deer Habitat	1
7	34	General Forest	3
8	108	Deer Habitat	4

Hazard trees - Proposed Action Alternative
Trees that pose a hazard to public safety on open roads would continue to be monitored and felled when identified as a hazard according to the R6 Hazard Tree standard (Harvey, Jr. & Hessburg, Sr., 1992). Utilization of felled trees for commercial use would not occur under this alternative.

Snags and Down Wood - Proposed Action Alternative

Alternative 2 includes design elements to leave dead trees (snags) and down wood at levels derived from DECAID as shown in *Table 2.6-2*. A total weighted average of 23 dead trees per acre ≥ 10 inches dbh would be retained on the 2,420 acres of stand replacement wildfire and 17 dead trees per acre ≥ 10 inches dbh within the 1,936 acres of fire salvage. Future percent cover of down wood would occur by the year 2013 as existing dead standing trees transition to dead, down wood.

Table 2.6-2 Post-salvage dead tree numbers for 2,420 acres of stand replacement

Size Class (diameter in inches-dbh)	Existing Dead Trees/Acre	Future Percent Cover Down Wood (>10" large end diameter)
4-7.5"	14.6	0
7.51-10.5"	19.1	1.4
10.51-13.5"	12.6	1.3
13.51-16.5"	3.3	0.5
16.51-19.50"	1.8	0.4
19.51"+	2.1	0.6
Total	53.5	4.2 percent

Forest Roads - Proposed Action Alternative

Access to designated units for harvest and hauling of logs would predominately be on existing forest roads. An estimated 3.5 miles of temporary road construction would be required to access harvest units. Existing roads used to clearcut harvest the area in the 1920s comprise the majority of the temporary roads to be reopened. Temporary roads would be closed after purchaser use. After completion of identified road closures, the existing open road density for the 3,810-acre fire area would be lowered from 3.6 miles per square mile to 1.9 miles per square mile. Of this total, 2.33 miles of open road per square mile is comprised of tertiary roads and 1.29 miles per square mile consists of arterial and collector roads 18, 1810, 9711, 9714.

Reforestation - Proposed Action Alternative
Reforestation would occur on 1,936 acres, not including the 73 acres previously approved adjacent to roads 18, 1810 and 9711.

Subsoiling – Proposed Action Alternative
Subsoiling would occur on about 57 acres of landings and roads within units, about 5 acres of roads outside units, and about 7 miles (~10 acres) of road closures.

Alternative 3

Objective – Alternative 3
The objective of this alternative is to implement only the reforestation and road closure activities described in Alternative 2.

Salvage harvest – Alternative 3
No salvage activities or timber harvest would result from this alternative.

Hazard trees – Alternative 3
Trees that pose a hazard to public safety on open roads would continue to be monitored and felled when identified as a hazard according to the R6 Hazard Tree standard (Harvey, Jr. & Hessburg, Sr., 1992). Utilization of felled trees for commercial use would not occur under this alternative.

Snags and Down Wood – Alternative 3

Under this alternative existing snag levels would remain. No treatments are planned that would affect snags or down wood.

Table 2.7-1 Existing dead tree numbers for the 2,420 acres of stand replacement

Size Class (diameter in inches-dbh)	Existing Dead Trees/Acre	Future Percent Cover Down Wood (>10" large end diameter)
4-7.5"	14.6	0
7.51-10.5"	19.1	1.4
10.51-13.5"	21.0	2.2
13.51-16.5"	13.5	2.0
16.51-19.50"	5.7	1.1
19.51"+	4.5	1.4
Total	78.4	8.1 percent

Forest Roads – Alternative 3
Access to designated units for reforestation would be on existing forest roads. After completion of identified road closures, the existing open road density for the 3,810-acre fire area would be lowered from 3.6 miles per square mile to 1.9 miles per square mile. Of this total, 2.33 miles of open road per square mile is comprised of tertiary roads and 1.29 miles per square mile consists of arterial and collector roads 18, 1810, 9711, 9714.

Reforestation – Alternative 3
Reforestation would occur on 1,936 acres, not including the 73 acres previously approved, adjacent to roads 18, 1810 and 9711.

Subsoiling –Alternative 3
Subsoiling would occur on about 5 acres of roads within units, about 5 acres of roads outside units, and about 7 miles (~10 acres) of road closures.

EVALUATION

This evaluation of the project area includes:

X A pre-field review
X A field survey
X An effects analysis
X Management recommendations (if a sensitive plant population exists).

PREFIELD REVIEW - METHODS AND RESULTS

Project area description: Soils within the 18 Fire project area are mainly comprised of sandy volcanic ash over sandy to loamy buried soils, while in some areas in the middle and southern end, mixed with highly fractured lavas.

The plant associations that dominate the 18 Fire project area are ponderosa pine/bitterbrush/fescue roughly in the north half, and ponderosa pine/bitterbrush-manzanita/fescue in the south half.

Elevations within the project area range from about 4200' at the north end of the project to about 4700' at the south end of the project. Average annual precipitation ranges from approximately 15-20".

The potential for sensitive plant species' habitat to occur in the project area was evaluated using the preceding information, as well as the following resources: aerial photo interpretation, vegetation map information, as well as personal knowledge of the project area.

Based on the preceding information, a comparison with the habitat requirements of Bend/Ft. Rock Ranger District potential sensitive species indicates that there is no likely habitat for PETS species within the

project area; only one species is suspected but was unlikely to exist there either prior to or in the years after fire recovery.

Species	Probability
Castilleja chlorotica (Green-tinged paintbrush, or CACH)	Low

FIELD RECONNAISSANCE

Proposed, Endangered, Threatened, and Sensitive (PETS) plant surveys had been conducted over roughly 30% of the project area prior to the 18 Fire, within the past 13 years, for various thinning, mowing, and special uses projects. Additionally, thousands of acres in the vicinity, in similar habitats as the project area, have also been surveyed within the same time frame.

SURVEY RESULTS

None of the surveys found any PETS plant species.

PROJECT EFFECTS

This section discusses what effects may occur as a result of the proposed project and what risks the effects may have on the viability of proposed, threatened, endangered, and sensitive species.

No Action Alternative Direct, Indirect, and Cumulative Effects:

There are no expected direct, indirect, or cumulative effects if this alternative is implemented, because there were no known populations prior to the fire, nor are there any expected to establish post-fire. This expectation is based on many visits to the general area in which the fire occurred over the past 13 years by the author and other Forest Service botanists. Differing seral stages within this plant association and habitat type have been surveyed in the area, including visits to nearby fires that have occurred within the past 13 years (such as the Horse Butte Fire), and no PETS plants have ever been located there.

Proposed Action and Alternative 3 Direct, Indirect, and Cumulative Effects:

As with the No Action alternative, the two action alternatives do not pose direct, indirect, or cumulative effects to PETS plant species if either of them are chosen, for the same reasons outlined in the discussion for the No Action alternative.

COMPARISON OF ALTERNATIVES

There are no identifiable differences between alternatives as they relate to PETS plant species, because none were known to exist prior to the fire, nor are they expected to establish in the post-fire conditions.

FINDINGS

The analysis of effects on species viability found the following:

For the No Action alternative:

There are no expected impacts to PETS plant species with the implementation of this alternative.

For the two action alternatives:

There are no expected impacts to PETS plant species with the implementation of these alternatives.

DESCHUTES NATIONAL FOREST – SENSITIVE PLANT CONTACTS

Forest Botanist – Katie Grenier (388-5564)
Crescent District Plant Coordinator – Carolyn Close (433-3234)
Bend/Ft. Rock District Plant Coordinator – Charmane Powers (383-4730)
Sisters District Plant Coordinator – Maret Pajutee (549-7727)

REFERENCES

Bend/Ft. Rock Ranger District Sensitive Plant Sightings Atlas
Bend/Ft. Rock Ranger District Cleared Areas Atlas
Larsen, 1976. Deschutes National Forest Soil Resource Inventory.

APPENDIX A

DESCHUTES NATIONAL FOREST SENSITIVE PLANT LIST

Thirty-one plants are currently on the Regional Forester's Sensitive Species List (FSM 2670.44, 7/04) for the Deschutes National Forest, as follows (BFR = Bend/Fort Rock District, CRE = Crescent District, SIS = Sisters District):

Scientific Name	Common Name	Listing Status	District		
			BFR	CRE	SIS
Agoseris elata	Tall agoseris	ONHP List 2	S	S	D
Arabis suffrutescens var. *horizontalis*	Crater Lake rockcress	Sp. Of Concern ONHP List 1	---	S	---
Arnica viscosa	Shasta arnica	ONHP List 2	D	S	S
Artemisia ludoviciana ssp. *estesii*	Estes' artemisia	Sp. Of Concern ONHP List 1	D	S	---
Aster gormanii	Gorman's aster	Sp. Of Concern ONHP List 1	S	S	S
Astragalus peckii	Peck's milk-vetch	Sp. Of Concern ONHP List 1	D	D	S
Botrychium pumicola	Pumice grape-fern	Sp. Of Concern ONHP List 1	D	D	---
Calamagrostis breweri	Brewer's reedgrass	ONHP List 2	S	S	S
Calochortus longebarbatus var. *longebarbatus*	Long-bearded mariposa lily	Sp. Of Concern ONHP List 1	S	S	S
Carex hystricina	Porcupine sedge	ONHP List 2	S	S	S
Carex livida	Pale sedge	ONHP List 2	S	S	S
Castelleja chlorotica	Green-tinged paintbrush	Sp. Of Concern ONHP List 1	D	S	S
Cicuta bulbifera	Bulb-bearing water-hemlock	ONHP List 2ex	S	S	S
Collomia mazama	Mt. Mazama collomia	Sp. Of Concern ONHP List 1	S	S	S
Dermatocarpon luridum (LICHEN)			S?	S?	S?
Gentiana newberryi var. *newberryi*	Newberry's gentian	ONHP List 2	D	S	D
Leptogium cyanescens (LICHEN)			S?	S?	S?
Lobelia dortmanna	Water lobelia	ONHP List 2	S	S	D
Lycopodiella inundata	Bog club-moss	ONHP List 2	S	D	S
Lycopodium complanatum	Ground cedar	ONHP List 2	S	S	S
Ophioglossum pusillum	Adder's-tongue	ONHP List 2	S	S	S
Penstemon peckii	Peck's penstemon	Sp. Of Concern ONHP List 1	S	S	D
Pilularia americana	American pillwort	ONHP List 2	S	S	---
Ramaria amyloidea (FUNGUS)			D?	D?	D?
Rorippa columbiae	Columbia cress	Sp. Of Concern ONHP List 1	S	S	S
Rhizomnium nudum (MOSS)			D	D?	D?
Scheuchzeria palustris var. *americana*	Scheuchzeria	ONHP List 2	D	S	S
Schistostega pennata (MOSS)			S	D	S
Scirpus subterminalis	Water clubrush	ONHP List 3	S	D	S
Scouleria marginata (MOSS)			S?	S?	S?
Thelypodium howellii ssp. *howellii*	Howell's thelypody	ONHP List 2	S	S	S

* CODES: D = Documented; S = Suspected; Species of Concern = Federal Designation; neither Endangered or Threatened; ONHP List 1 = Oregon Natural Heritage Program List: Contains species which are endangered or threatened throughout their range or which are presumed extinct; ONHP List 2 = Oregon Natural Heritage Program List: Contains species which are threatened, endangered or possibly extirpated from Oregon, but more common or stable elsewhere; ONHP List 3 = Oregon Natural Heritage Program List:

Contains species for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range; ONHP List 4 = Oregon Natural Heritage Program List: Contains species of concern which are not currently threatened or endangered.

APPENDIX B
HABITAT DESCRIPTION FOR *Castilleja chlorotica*

CACH, or green-tinged paintbrush, is a perennial eastern Oregon endemic, known only from Deschutes, Lake, and Klamath Counties. It had been found at 4300' to 8200' elevation in open and forested ponderosa, lodgepole, and mixed conifer. It has also been found in nonforested sagebrush-bitterbrush types. Soils are often very poor and rocky.

An important life history factor to note about the Castilleja genus is that it is hemiparasitic, which means it contains chlorophyll and may or may not be able to complete its life cycle without a host species; hemiparasites primarily draw water and minerals from the host. It is not known which species is the host for CACH, although it is suspected to be a shrub (Dr. Richard Everett, pers. comm.). On the Fremont National Forest, upon which the majority of the known CACH population exists, the host is suspected to be sagebrush; on the Deschutes National Forest sites, it may be bitterbrush. Successful CACH reestablishment after a fire or other disturbance may depend upon the reestablishment of its host.

APPENDIX G: RESPONDING TO GENERAL PRINCIPLES AND RECOMMENDATIONS OF BESCHTA ET AL. (1995, 2004)

The 18 Fire Recovery Project Interdisciplinary Team (IDT) considered the general principles and recommendations provided by Beschta et al in their paper "Wildfire and Salvage Logging", 1995 and "Postfire Management on Forested Public Lands of the Western United States", 2004.

Based on considerable academic experience, the authors of Beschta et al provide their opinions on the issue of salvage following wildfires in the form of general principles and recommendations. The authors present their suggested policy principles and land management recommendations as generally applicable to federal lands throughout the western United States, or at least the interior Columbia and upper Missouri basins. The recommendations presented in the paper are not focused on the specific ecological, social, and economic characteristics of the post-fire conditions of the18 Fire Recovery Project area. Additionally, the authors do not consider the multiple use goals, objectives and standards of the Deschutes Forest Plan. Thus, the IDT considered the authors' suggested principles and recommendations in the context of specific post-fire conditions for the 18 Fire Area and Forest Plan management direction of the Deschutes National Forest.

The following is a summary of how the IDT and 18 Fire Recovery Project FEIS address the issues raised by Beschta et al (1995). All bold text is from the Beschta document. This is followed by pertinent text from "Postfire Management on Forested Public Lands of the Western United States", 2004. The IDT also reviewed and considered the Declaration of Jonathan J. Rhodes in the United States District Court for the Western District of Washington at Seattle, June, 2004 in the FEIS. Mr. Rhodes along with Dr. Beschta is one of the coauthors of the 2004 "Postfire Management on Forested Public Lands of the Western United States"document.

"Ongoing human activity and the residual effect of past activity continue to threaten watershed ecosystem integrity.

a. "The ability of ecosystems to recover has been substantially compromised."

b. "Attempting to continue to manage fire and its consequences without altering or controlling other threats to ecosystems integrity, including logging, grazing, road building, and mining is scientifically and pragmatically unsound."

It is recognized by the team that the project area within which proposed salvage would occur have had some degraded conditions incurred as a result of past management activities. Existing conditions are summarized within the Affected Environment and the Environmental Consequences Chapter of the FEIS. Although past management has caused some levels of environmental stress, land management agencies have made significant progress toward a holistic ecosystem approach in recent years (Everett, 1995).

The effects of the proposed salvage and alternatives on wildlife, soils and other resources are described in Chapters 3 and 4 of the FEIS.

Analysis of post-fire conditions reveals cumulative effects as a result of the 18 Fire may have placed some of the ecosystem components at risk for degradation, specifically erosion susceptibility due to wind. The risks identified, however, are short-term when considering vegetative recovery following the fire. Field reconnaissance of burn severity and vegetative recovery has shown that re-growth has not been inhibited as a result of the fire and that the ability of this ecosystem to recover has not been substantially compromised.

Proposed activities are located on soils that are well-drained (pumice) and BMP's would be employed. In a letter dated 11/25/2003, the District Fisheries Biologist states, "A field reconnaissance of the 18 Fire Salvage Area on 11/20/03 did not locate any riparian, perennial, intermittent, or ephemeral stream channels in the project area." There would be no effects to riparian, water resources, ground water or fisheries from the proposed salvage of dead trees (FEIS, pg. 49). There is no potential for overland flow of sediments into streams as a result of any proposed activities. Surface run-off is rare or nonexistent in the project area because of highly permeable volcanic soils. The nearest perennial stream channel is the Deschutes River approximately 6 miles west of the project area. There would be no effects to the hydrology of the Deschutes River as flows in the Deschutes are driven by groundwater and water storage practices in the Upper Deschutes basin. There would be no effects to any Oregon Department of Environmental Quality 303(d) listed waterbodies, and no effects to Essential Fish Habitat because none exists within the project area."

The proposed salvage described in the 18 Fire Recovery Project EIS is one of several projects being considered in a larger context of fire restoration. A road analysis has been completed and a road management proposal has been developed which proposes to reduce the number of open roads within the fire area. Also common to all action alternatives is planting various levels of conifer regeneration. Burned Area Emergency Rehabilitation (BAER) projects such as monitoring for noxious weeds are ongoing within the fire perimeter.

"Fires are an inherent part of the disturbance and recovery patterns to which native species have adapted.

a. "Fires are part of the pattern of disturbance and recovery that provides a physical template for biological organization at all levels." Fires reset temporal

patterns and processes that, if allowed to proceed undisturbed by additional human impacts, provide dynamic and biologically critical contributions to ecosystems over long time frames."

In significantly altered ecosystems, natural disturbance processes may be no longer operating within historical ranges of variability (Agee 1994b, Hessburg et al. 1994), and their effects may be as foreign to the functioning of the ecosystem as human activities (Everett, 1995). The 18 Fire area was clearcut harvested in the 1920's. Subsequent fire suppression activities did not allow fire to operate within its role as a natural disturbance agent for the dry, ponderosa pine plant associations found within the 18 Fire Recovery project area. The area has missed several return intervals for fire due to effective fire suppression.

The action alternatives were developed in varying degrees to "reset" the stands to a point where the potential historical role of fire regimes can be used to retain the ecological benefits while responding to the needs of society and the goals of the Deschutes Forest Plan. This is especially true within the 18 Fire Recovery project area where frequent low intensity fires were the norm. Though fire is recognized as an important disturbance process within the 18 Fire Recovery Project area several points must be considered in the management of the area:

- The conditions present within the area prior to the fire reflected past management history including fire suppression. These conditions include the following vegetation trends:
    - Increased stand densities and shrub layers.
    - An increase in the amount and distribution of fuels.
    - Increased probability of a stand replacement disturbance
- Given that the pre-fire vegetation conditions were outside the historic ranges of variability, the fire itself was of such intensity and size that it also was outside the range of historic of variability.
- The design of the action alternatives in the 18 Fire Recovery Project FEIS includes actions that would restore vegetation and fuels to sustainable conditions within most of the fire area that currently do not provide the habitat for the white-headed woodpeckers and other species that prefer late and old ponderosa pine forests..

b. "The 'patchiness' of fire is a desirable characteristic, and many species depend on the environmental influences that fires create."

It is important to discuss the fire recovery effort in the context of what is being retained. The area within the perimeter of the 18 Fire totals about 3,810 acres. Table G-1 displays

burn intensity by areas retained where no salvage activity would occur by action alternative.

Table G-1: 18 Fire Burn Intensity by Areas Where No Commercial Salvage Activities Will Occur

Burn Intensity	Acres and Percent Within 18 Fire Perimeter	Acres and Percent of Fire Where All Dead Trees Are Retained by Alternative		
		Alt. 1	Alt. 2	Alt. 3
Non-Lethal	1390 36%	1,390 100%	1,390 100%	1,390 100%
Lethal (Stand Replacement)	2420 64%	2,347 97%	411 17%	2,347 97%
Total Acres	3,810	3,737	1,801	3,737

"There is no ecological need for immediate intervention on the post-fire landscape."

Letting nature take its course may not be the best post-fire management approach. By the time we find that natural recovery processes are not functioning, significant ecosystem degradation could have occurred (Everett, 1995).

Future fire hazard is complex with or without wood removal. Current research and comments received from scoping suggests that salvage logging may actually create an elevated fire hazard. This is an assumption the 18 Fire team has adopted and addressed by using whole tree yarding and limited salvage (30 trees/per/acre). However, compared to the areas where no biomass is removed, this is a short term effect. Snag longevity monitoring of similar stand replacement fires for ponderosa pine (blackbark) stands indicate a significant pulse of log biomass from burned snags starts to occur after approximately 8 to15 years. Standing snags of all sizes present a much reduced fire hazard than down logs until they begin to fall. Then, this effect becomes a long term issue for those areas that had no biomass removed. Regardless of the size of the snags, brush and small material has accumulated to a point where the potential for a high rate of spread is present. With an additional elevated amount of down logs, the resistance to control (placement of firelines) and potential for intensity (effects on the tree crowns) and severity (effects on soils) is much higher.

Included in the purpose and need of the 18 Fire Recovery Project is the recovery of a ponderosa pine stand. There are primarily two courses of action that can be followed post-fire to regenerate conifers. Both are a function of time. By letting nature take its course and allowing natural regeneration, the lack of seed source and browsing by a large deer herd (deer winter range) would delay successful regeneration of ponderosa pine by decades, if ever. This is also due to global climate changes and cycles of wet periods that created favorable conditions during the establishment of the pre-fire forest. According to Beschta, "…human disturbances, unlike Mount St. Helens or El Nino, tend to be

incessant, and thereby may produce conditions outside the evolutionary experience of native species." There are no guarantees landscapes would not continue to be influenced by some human disturbances. Therefore, by choosing immediate intervention and planting of ponderosa pine some desired attributes of forested landscapes can be jump started.

Existing condition should not be used as "baseline" or "desired" conditions upon which to base management objectives.

As previously stated, this ecosystem is significantly altered and natural disturbance processes may be no longer operating within historical ranges of variability. It would not be logical to use the existing pre-fire condition as a basis for management objectives. Desired conditions and management objectives are set forth in the Deschutes Forest Plan as amended by the Eastside Screens.

"Fire suppression throughout forest ecosystems should not automatically be a management goal of the highest priority."

General fire suppression goals, and standards and guidelines are described in the Deschutes Forest Plan and Fire Management Plan. Fire management goals and forest wide standards and guidelines are described in the Forest Plan pages 4-73 through 4-74. Fire suppression as a management goal is beyond the scope of this salvage proposal and analysis. However, management of fuel loadings to facilitate the eventual reintroduction of prescribed fire to mimic its historic role is a desired condition within the project area.

"From a watershed perspective, the region suffers an ecosystem health problem, but the primary cure rests in curtailing human activities known to be damaging and counterproductive, and repairing or restoring roads that act as permanent sources of adverse impact."

The analysis conducted for the 18 Fire Recovery Project is landscape-based. Currently, there is a temporary public closure in the fire area. This action was intended to protect human safety and to curtail human activities such as inappropriate access off of the road system. To protect deer habitat and curtail human activities a permanent winter seasonal closure will be implemented.

The Bend Fort Rock (BFR) Ranger District conducted an analysis post fire to determine the best use of the current transportation system within the fire area. An access management plan for the area has been developed which proposes to obliterate 7 miles of access and close 5.6 miles. These recommendations are common to all action alternatives in the document.

Because of the high level of existing roads, a relatively small number of miles of temporary roads would be needed to access the interior of proposed units (Alternative 2 –

3.5 miles). Established for a specific short-term purpose and to prevent low-level casual use, such roads are decommissioned at the completion of their intended use.

"We recommend that management of post-fire landscapes should be consistent with the following principles."

a. "Allow natural recovery and recognize the temporal scales involved with ecosystem evolution." "Human intervention on the post-fire landscape may substantially or completely delay recovery… or accentuate the damage."
b. "There is little reason to believe that post-fire salvage logging has any positive ecological benefits, particularly for aquatic ecosystems."
c. "There is considerable evidence that persistent, significant environmental impacts are likely to result from salvage projects… These impacts include soil compaction and erosion, loss of habitat for cavity nesting species, loss of structurally and functionally important large woody debris."

The 18 Fire Recovery Project analyzed both passive and active management scenarios (Chapter 3, FEIS). According to Everett (1995), the protection of short and long-term recovery elements may be in conflict, but protecting the resource with the longest recovery period should be given added emphasis. By emphasizing the restoration of a dry, ponderosa pine forest the active management approach may have a better chance at maintaining long-term biodiversity following the fire than a custodial approach.

The Forest intends to implement the proposed activities in a manner in which the needs of soil, wildlife, and other ecosystem resources are provided for within the context of the treatment proposal. The FEIS, Chapter 2 lists the design elements and mitigation measures that have been developed.

As noted before there are no aquatic or aquatic-influenced (riparian) areas within or adjacent to the 18 Fire Recovery Project Area., a majority of the recovery taking place would allow recovery processes to occur with limited intervention.

Areas proposed for treatment within the 18 Fire generally do not exceed 15 percent slope and there are no identified areas of erosion concern identified with salvage operations. Slopes within the project area exceeding 30 percent are confined to Bessie and Luna Buttes. Neither of the buttes is included in any salvage or mechanical treatment areas. Ground-based harvest systems would be implemented using designed layouts intended to limit the extent of multiple machine trips and associated detrimental compaction. Since detrimental soil disturbance would not exceed 20 percent, significant environmental impacts to the soil resource would not occur.

Harvest prescriptions (using) have been designed to provide snags and coarse woody debris to address the needs of all cavity nesting, foraging and associated dependent species. Bitterbrush would be planted on identified road obliterations and other reclaimed transportation and logging facility developments such as landings and temporary roads. There are also a minimum of 1,801 acres within the fire perimeter

that are not proposed for salvage that would be left to recover naturally.

Human intervention following wildfires does not always cause adverse impacts to resources. Although little can be done to control organic matter loss during wildfires, every opportunity must be taken to revegetate the site so that organic litter can be restored as quickly as possible (Debano, 1991). Coarse woody debris and surface litter are currently deficient in some burned portions of the project area. Decaying wood and organic litter are critical for maintaining the soils ability to retain moisture and provide both short and long-term nutrient supplies for the growth of vegetation. Mycorrhizal fungi and soil organisms also depend upon the continuing input of woody debris and fine organic matter.

Human intervention is needed to expedite the establishment and restoration of ponderosa pine stands, reduce excessive fuel loadings and the potential for high-severity reburns, and improve the hydrologic function and productivity on compacted soils dedicated to specific roads and logging facilities that would no longer be needed for future management.

Under Alternative 2, salvage harvest operations would be expected to accelerate the accumulation of woody debris where these materials are currently lacking within portions of some activity areas. Enough fallen trees and other organic materials would likely be generated after salvage activities to meet recommended guidelines for maintaining soil productivity during the fire recovery period.

The proposed activity areas avoid areas with sensitive soils. There are no sensitive soils with high erosion hazards within the project area. Sensitive soils with steep slopes (greater than 30 percent) were excluded from management consideration. Salvage harvest and fuel reduction treatments would occur on gently sloping lava plains (0 to 15 percent slopes) that contain well-drained soils with low hazards for surface erosion. The removal of fire-killed trees would have no affect on evapotranspiration rates and potential increases in overland flows of water. Logging slash and fallen dead trees would provide additional ground cover that would slow the velocity of any runoff water and improve the soils ability to resist erosion from precipitation events or snowmelt that occurs during the fire recovery period.

Over the next 20 years, it is expected that the majority of fire-killed trees will become heavy fuel loadings that increase the risk for future wildfires to an unacceptable level. Post-fire sampling estimates indicate that potential biomass from down woody debris could range from 40 to 60 tons per acre within areas affected by stand-replacement fire (FEIS, Chapter 3). High-to-extreme fire hazard and potential for excessive soil heating exists when downed woody debris exceeds 30 to 40 tons per acre (Brown et al., 2003). If a large amount of fuel is present during a future wildfire, soil temperatures can remain high for long duration and excessive soil heating would be expected to produce large changes in soil chemical, physical, and biological properties (DeBano, 1991).

Under Alternative 2, fuel reductions would be accomplished by whole-tree yarding

salvaged trees and the logging slash would be machine piled and burned on log landings. Over time, the residual trees that remain after harvest will gradually fall to the ground, and it is estimated that future fuel loadings would be reduced to an acceptable average range of 15 to 20 tons per acre. Although this method removes potential sources of woody debris off-site, it would not cause additional soil impacts because burning would occur on disturbed soils that already have detrimental conditions. Soil restoration treatments would be implemented to reduce the amount of detrimentally disturbed soil on log landings following these post-harvest activities.

Under the action alternatives, soil restoration treatments would be applied with a winged subsoiler to reclaim and stabilize detrimentally compacted soil on certain management facilities. Under Alternative 2, subsoiling treatments would be implemented on all temporary roads, all log landings, and approximately 500 feet of all main skid trails that lead into log landings following post-harvest activities. Under Alternatives 2 and 3, road decommissioning (obliteration) treatments would alleviate compacted road surfaces on about seven miles of local system road which are no longer needed for long-term access. Restoration treatments, such as subsoiling, are designed to loosen compacted soil and improve the hydrologic function and productivity on disturbed sites. Subsoiled areas are expected to reach full recovery through natural recovery processes within the short-term.

"No management activity should be undertaken which does not protect soil integrity."

a. **"Soil loss and compaction are associated with both substantial loss of site productivity and with off-site degradation (water quality)."**
b. **"Reduction of soil loss is associated with maintaining the litter layer."**
c. **"Although post-burn soil conditions may vary dependent upon fire severity, steepness of slope, inherent erodibility, etc., soils are particularly vulnerable in burned landscapes."**
d. **"Post-burn activities that accelerate erosion or create soil compaction must be prohibited."**

The IDT acknowledged the potential for adverse impacts to the soil resource and established design criteria to address this issue. The proposed management activities would occur on gently sloping lava plains that contain well-drained soils with high infiltration rates and low hazards for surface erosion. Due to the minor amount of severely burned soil and adequate amounts of existing soil cover, the effects of ground-disturbing management activities would likely be similar to those observed in unburned stands of live trees. The development and use of temporary roads, log landings, and skid trail systems are the primary sources of physical disturbance that would result in adverse changes to soil productivity. The majority of soil impacts would be confined to known locations in heavy-use areas that can be reclaimed when these facilities are no longer needed for future management.

The combined effects of current soil disturbances and those predicted from implementation of the proposed actions were addressed in the Environmental Effects section. The environmental effects of each of the alternatives are described and tracked by three issue indicators. One of these indicators addresses the probable success in project design and implementation of management requirements and mitigation measures that would be applied to minimize adverse impacts to soil productivity.

In order to protect or maintain soil conditions at acceptable levels, plans for projects must include provisions for mitigation of ground disturbances where activities are expected to cause resource damage. Mitigation measures are specific actions that could be taken to minimize, avoid or eliminate potentially significant impacts on the resources that would be affected by the alternatives, or rectifying the impact by restoring the affected environment (40 CFR 1508.02). Various research references and both Regional policy (FSM 2520, R-6 Supplement No. 2500-98-1) and LRMP direction were used as guidance in determining design elements and mitigation needs for this project proposal.

Under Alternative 2, the management requirements, mitigation measures and BMPs listed for the soil resource (FEIS, Chapter 2) are incorporated into the project design to avoid or minimize potentially adverse impacts from ground-disturbing management activities. Operational guidelines are included in design elements that provide options for limiting the amount of surface area covered by logging facilities and controlling equipment operations to minimize the potential for detrimental soil disturbances in random locations of activity areas. The steep slopes on Bessie and Luna buttes were excluded from the proposed activity areas in order to avoid soil displacement and potential erosion damage on sensitive soils. Other examples of project design criteria include limiting the amount of traffic off designated areas or operating equipment over frozen ground or a sufficient amount of compacted snow. Soil restoration treatments, including road decommissioning, would be applied to rectify impacts by reducing the amount of detrimentally compacted soil committed to specific roads and logging facilities.

All reasonable BMPs would be applied to minimize the effects of road systems and timber management activities on the soil resource. The BMPs are tiered to the Soil and Water Conservation Practices Handbook (FSH 2509.22), which contains conservation practices that have proven effective in protecting and maintaining soil and water resource values. The Oregon Department of Forestry evaluated more than 3,000 individual practices and determined a 98 percent compliance rate for BMP implementation, with 5 percent of these practices exceeding forest practice rules (National Council for Air and Stream Improvement, 1999).

If the Responsible Official selects an action alternative, these management requirements, project design elements and mitigation measures are to be implemented during and following project activities to meet the stated objectives for protecting and maintaining soil productivity.

"Preserve species' capability to naturally regenerate."

> **"If warranted, artificial regeneration should use only species and seed sources native to the site, and should be done in such a way that recovery of native plants or animals is unhampered."**

No emergency seeding of grasses or forbs was recommended by the Burn Area Emergency Rehabilitation team. The elevated risk of erosion due to the loss of surface cover was not deemed to be enough to justify additional emergency measures due to the gentle slopes, well-drained soils, and low severity burn characteristics.

Planting of native ponderosa pine seedlings is proposed, ranging from 0 acres in Alternative 1 (note 73 acres of roadside planting was including in a previous decision) to 1936 acres (2009 acres when combined with the 73 acres) in Alternatives 1 and 2.

Natural regeneration of conifers throughout the fire is unlikely to occur at significant rates since last years' seed sources were burned before full maturation. The return of native annuals and shrubs has occurred to significant cover levels within other fire salvage areas on the Forest and has already become well established during the first growing season following the 18 Fire.

"Do not impede the natural recovery of disturbed systems."

Much of the fire area would have limited intervention on the post fire landscape. What Beschta considers "natural recovery" would range from 98 percent in Alternative 1 to 47 percent in Alternatives 2 and 3. Exotic noxious weed populations are being monitored and treated to limit their influence on delaying the recovery of native species. Treatment of known sites under the 1998 Deschutes National Forest Noxious Weed EA and monitoring of noxious weeds began immediately post-fire and would continue.

The 18 Fire burned in a classic mosaic pattern of moderate and lightly burned areas. Based on field reconnaissance, approximately 61 percent was classified as low burn severity and 39 percent was determined to be moderate burn severity (BAER Soil Specialist Report, 2003). Although the fire caused high mortality of overstory trees, ground-level heating was typically not elevated to temperatures capable of altering soil properties that affect site productivity. The minor extent of severely burned soil was generally confined to isolated spots beneath downed logs or around root crowns of individual trees. These sites were minor inclusions in areas mapped as moderate burn severity and likely comprise less than one percent of the burned acreage.

All burned areas are susceptible to short-term increases in surface runoff and erosion until vegetative recovery takes place. The sandy textures of the dominant, ash-influenced soils have high infiltration rates that account for low amounts of overland flow and natural erosion. There are no sensitive soils with high erosion hazards in the project area. Monitoring results of previous fires on the district indicate that overland flow of water and evidence of surface erosion is typically nonexistent in burned areas with gentle

slopes. Steep slopes with sparse vegetation generally have greater amounts of surface runoff which increases the erosion potential. Therefore, sensitive soils with steep slopes (greater than 30 percent) on Bessie and Luna buttes were excluded from management consideration. Livestock grazing has not occurred since 1990 and is currently postponed to allow the recovery of herbaceous vegetation.

All soils are susceptible to soil movement whenever rainfall intensities or snowmelt are great enough to cause overland flow. Measurements of post-fire infiltration rates of surface soils did not indicate elevated levels of hydrophobic (water repellant) soil conditions that would lead to increased runoff and accelerated erosion. At the present time, adequate soil cover currently exists within the proposed activity areas to control erosion rates within tolerable limits. Under Alternative 2, the proposed salvage harvest and fuel reduction treatments are not expected to cause accelerated erosion rates that would have any long-term adverse effects to soil productivity. The absence of stream channels within or adjacent to the project area assures that there is no potential for overland flow of sediments that could affect listed 303(d) waterbodies or essential fish habitat outside of the project area.

Decommissioning and closure of roads as noted would aid in natural recovery processes, returning areas capable of supporting vegetation to a less disturbed condition. There would be no new construction of roads that would be retained as part of the transportation system. Approximately 3.5 miles (total) of temporary road would be constructed to allow access to some activity areas, but these roads would be obliterated upon completion of salvage activities. Currently, there is a temporary public closure in the fire area to prevent inappropriate access off of the classified road system. All reasonable BMPs for timber management and road systems would be applied to protect the soil resource and control erosion on roads and logging facilities that may be used during project implementation.

Project design and the level of success in implementing the management requirements, mitigation measures and BMPs determine the overall magnitude of soil disturbance within the individual activity areas proposed for these restoration treatments.

Recommendations on Post-fire Practices

"Salvage logging should be prohibited in sensitive areas."

a. **"Logging on sensitive areas is often associated with accelerated erosion and soil compaction."**
b. **"Salvage logging by any method must be prohibited on sensitive sites, including: severely burned areas (no duff layer), on erosive soils, on fragile soils, in roadless areas, in riparian areas, on steep slopes, or any site where accelerated erosion is possible."**

Sensitive soils were considered to be those identified in the Deschutes LRMP. Sensitive soils within the project area include: 1) soils on slopes greater than 30 percent, 2) soils associated with frost pockets in cold air drainages, and 3) soils that occur in localized areas of rocky lava flows. There are no potentially wet soils with high water tables or sensitive soils with high erosion hazard ratings that would require special mitigation.

As described in the previous responses (above), sensitive soils that could be adversely impacted by ground-disturbing management activities were excluded from management consideration or, in the case of roadless areas or riparian areas, simply do not exist within or adjacent to the 18 Fire Recovery Project area.

"On portions of the post-fire landscape determined to be suitable for salvage logging, limitations aimed at maintaining species and natural recovery processes should apply."

a. **"Dead trees (particularly large dead trees) have multiple ecological roles in the recovering landscape including providing habitat for a variety of species, and functioning as an important element in biological and physical processes. In view of these roles, salvage logging must leave at least 50% of the standing dead trees in each diameter class; leave all trees greater than 20 inches dbh or older than 150 years; generally, leave all live trees."**
b. **"Because of soil compaction and erosion concerns, conventional types of ground-based yarding systems should be generally prohibited."**
c. **"Helicopter and cable systems using existing roads and landings may be appropriate, however, even these… methods could locally increase runoff and sediment."**

The value of dead trees in biological and physical processes is recognized by the team and addressed in the snag and downed wood habitat and soils sections of Chapter 3. The 18 Fire Recovery Project area has missed several fire return intervals and the current level of snags is far greater than would exist under a normal fire regime. Prescriptions for salvage, under Alternative 2, would remove only a portion of the dead trees. As stated before, all live trees would be retained under all alternatives, regardless of fire damage. Many of these severely damaged green trees can be expected to die during the coming years and provide replacement snags in addition to the dead trees already being retained for wildlife habitat and CWD within the 3,810 acre fire.

Table G-2 shows the percentage of trees that would remain in each diameter class by alternative within the 3,810 acre fire:

Table G-2: 18 Fire Trees Retained by Diameter Class

	Alternative 1		Alternative 2		Alternative 3	
Diameter Class by (dbh)	Percent Dead Trees Retained	Percent Dead & Green Trees Retained	Percent Dead Trees Retained	Percent Dead & Green Trees Retained	Percent Dead Trees Retained	Percent Dead & Green Trees Retained
4-7.5”	100%	100%	100%	100%	100%	100%
7.50-10.5”	99.7%	99.8%	99.7%	99.8%	99.7%	99.8%
10.51-13.5”	97.7%	98.3%	66.8%	75.2%	97.7%	98.3%
13.51-16.5”	97.7%	98.4%	38.1%	57.5%	97.7%	98.4%
16.51”-19.5”	97.7%	98.5%	35.3%	58.3%	97.7%	98.5%
19.51”+	97.9%	98.5%	55.7%	68.8%	97.9%	98.5%

These levels are a result of Deschutes LRMP direction for retention, recruitment and cycling of snags and coarse woody material at levels that maintain ecological processes across the landscape (based on Decaid).

Table G-3 shows the percentage of CWD estimated to occur within 15 years based on the cover or “footprint” provided by down logs/acre at least 10 inches in diameter on the large end, 5 inches on the small end and at least 40 feet long:

Table G-3:

18 Fire CWM/Acre “Footprint”

Burn Intensity	Acres and Percent Within 18 Fire Perimeter	Acres and “Footprint of CWM Retained by Alternative		
		Alt. 1	Alt. 2	Alt. 3
Non-Lethal	1390 36%	1,390 4.1%	1,390 4.1%	1,390 4.1%
Lethal (Stand Replacement)	2420 64%	73 3.2% 3,737 8.1%	411 8.1% 2,009 3.2%	73 3.2% 3,737 8.1%

The desired footprint based on Decaid for the plant association groups within the 18 Fire Recovery Project area is 1.4 percent. All alternatives would exceed this level.

The effects analysis for the soil resource addresses this issue by comparing post-fire existing conditions to the anticipated conditions which would likely result from implementing the action alternatives. As described in previous responses, soils in the proposed activity areas were not severely burned, and salvage logging would occur on gently sloping lava plains (0 to 15 percent slopes) that contain well-drained soils with low hazards for surface erosion. Sensitive soils that could be adversely affected by ground-based logging activities were excluded from all proposed activity areas. Adequate soil cover currently exists to slow the velocity of any runoff water and control erosion rates

within tolerable limits. Monitoring of previous fires on similar soils and landforms has shown that overland flow of water and evidence of surface erosion is typically nonexistent within both logged and unlogged portions of burned areas. It is expected that the use of modern, ground-based equipment and designated skid trail systems would result in similar effects to those observed in unburned areas.

Under Alternative 2, the development and use of temporary roads, log landings, and skid trail systems are the primary sources of physical disturbance that would result in adverse changes to soil productivity. The majority of soil impacts would be confined to known locations in heavy-use areas that can be reclaimed when these facilities are no longer needed for future management. Best Management Practices would be applied to control erosion on and adjacent to roads and logging facilities that would be used during project implementation. The management requirements, mitigation measures and BMPs (FEIS, Chapter 2) are incorporated into the project design to avoid or minimize potentially adverse impacts to the soil resource.

Salvage harvest operations would be expected to accelerate the accumulation of woody debris where these materials are currently lacking within portions of some activity areas. Enough fallen trees and other organic materials would likely be generated after salvage activities to meet recommended guidelines for maintaining soil productivity. This would expedite decomposition processes and input of organic materials into the soil surface.

"Building new roads in the burned landscape should be prohibited."

The action alternatives of the 18 Fire Recovery Project FEIS do not include any permanent road construction although they do propose to establish or reopen temporary roads. In order to prevent low-level casual use, such roads and landings are decommissioned at the completion of their intended use. Because of the high level of existing roads, a relatively small number of miles of temporary roads would be needed to access the interior of proposed units (Alternative 1, 0 miles, Alternative 2, 3.5 miles, Alternative 3, 0 miles). At the completion of the sale, all temporary roads would be decommissioned and revegetated with ponderosa pine and native species such as bitterbrush.

Alternatives 2 and 3 propose to reduce the number of open roads by closing 2.9 miles and obliteration of 7.0 miles to improve habitat effectiveness for big game. There is no potential for run-off and sediment delivery problems. All applicable BMPs for road systems would be applied to protect the soil resource and control erosion on roads that may be used as haul routes for this project.

"Active reseeding and replanting should be conducted only under limited conditions."

a. "Active planting and seeding has not been shown to advance regeneration and most often creates exotic flora. Therefore, such practices should be

employed only where there are several years of evidence that natural regeneration is not occurring."

b. "Native species from regional stocks that may enhance fire resistance of site may be planted if the effect is to not homogenize the landscape."

c. "Seeding grasses into burned forests has been shown to disrupt recovery of native plants and is likely to create more problems than it solves."

d. **"The use of pesticides, herbicides, and fertilizers should generally be prohibited."**

No seeding of native forbs and grasses was recommended by the BAER process and none has occurred within the fire perimeter. The return of native annuals and shrubs has occurred within other fire salvage areas on the Forest and has already become well established post-fire.

The Forest Service has a policy to reforest capable lands that have been deforested as quickly as practicable.[1] Within areas of moderate to high mortality, natural regeneration of ponderosa pine is unlikely to occur at significant rates since last years' seed sources were burned before full maturation and the fire killed over 95 percent of the trees on 2,420 acres of the fire. To wait "several years until there is evidence the natural regeneration is not occurring" would miss the window to re-establish ponderosa pine at , almost, any cost within the next 75 to 100 years. The Skeleton Fire, which was not planted and which contains similar plant association groups, has shown little or no natural regeneration during the last 8 years (personal communication with BFR Reforestation Forester, Matthew Deppmeier, 2004) due to competition for moisture with the native forbs and grasses that quickly reestablished on the fire. The strategy is not to homogenize the landscape but to move towards providing cover and thermal percentages specified for the Deer Habitat Management Area and to ensure some conifer regeneration for forest associated species.

The strategy for managing competing and unwanted vegetation associated with the 18 Fire Recovery Project activities is prevention. Design elements and site-specific recommendations for preventing introduction and spread have been incorporated into all action alternatives. These prevention strategies would alleviate most potential problems dealing with competing and unwanted vegetation. No other application of pesticides, herbicides, or fertilizers is planned within the fire perimeter.

"Structural post fire restoration is generally to be discouraged"

Surface erosion by water is not a major concern on these coarse textured soils with high infiltration rates. There is no potential for overland flow of sediments to reach stream channels outside of the project area. Therefore, the BAER team did not recommend any post-fire structural restoration projects.

[1] November 19th, 2002 letter from the Regional Forester to Forest Supervisors

Post fire restoration immediately following suppression activities included rehabilitation of dozer line which included scarification for water percolation. None of the alternatives considered in the EIS propose the installation of structures to function as sediment traps.

"Post-fire management will generally require reassessment of existing management."

a. By increasing runoff, erosion, and sedimentation, fire may increase the risks posed by existing roads.
b. Therefore, post-fire analysis is recommended to determine the need for undertaking road maintenance, improvement, or obliteration.

The recommendations for road obliteration (decommissioning) and road closures (inactivation) are being carried forward from the Kelsey Roads Analysis and incorporated into the design of the action alternatives.

Immediately following the 18 Fire, resource conditions were assessed as part of the BAER process. An additional analysis was completed in a rapid assessment effort conducted by the district and forest specialists. These assessments considered existing management and the risks inherent in the condition of the watershed, from which numerous fire recovery and rehabilitation projects have been proposed or completed.

In order to allow for adequate recovery of herbaceous vegetation, livestock would not resume grazing in the project area until the fall of 2005, at the earliest.

"Continued research efforts are needed to help address ecological and operational issues."

The IDT acknowledges the value of continued research regarding post-fire activities. Within the Forest Service, only the research branch can conduct scientific research, therefore research projects are beyond the scope of this FEIS. Local monitoring would be conducted to evaluate whether adjustments in management practices may be necessary to achieve various resource objectives. For example, although the BAER response team concluded that no emergency measures were necessary, the team compiled recommendations and funding to monitor noxious weeds. Research studies were used to develop conservative recommendations for leaving sufficient coarse woody debris following management activities (Graham et al. 1994, Brown et al. 2003).

The IDT recognizes that the likelihood of ignition does not change significantly as a result of salvage or increased down wood levels. What can change, however, are fire behaviors, intensities and associated effects to resources should a reburn occur. This would be one area where more research efforts could contribute to better defining the long term risks associated with limited intervention on post-fire landscapes. Ice (1996) references the reburn of the Tillamook fire in the Oregon coast range within six years following that event. Also, a previous fire on the Deschutes National Forest (Eyerly) has anecdotal references that document the reburn of thousands of snags and deadfall down

wood throughout the fire area, although no evidence of the severity of this event was included.

The role of down and dead wood in providing for the full range of ecosystem processes and the needs of species is a difficult balance to provide for (sometimes) competing short and long-term objectives. The 18 Fire Recovery FEIS provides for snag and coarse wood levels mandated by the Deschutes LRMP standards and guidelines. The introduction of the Decayed Wood Advisor (DecAID) tool developed by Marcot et al. (2002) into the wildlife analysis of this project is an ongoing endeavor used as an advisory analysis tool to help land managers evaluate effects of forest conditions and proposed management activities on organisms that use snags, down wood, and other wood decay elements. A large number of acres within the fire perimeter would not have any wood removed as a result of proposed activities and would carry significant loads of this material into the future. Treated acres would have snags and down wood at levels that would provide for some of the needs of species associated with this component.

The environmental effects of post-fire salvage and site preparation are described within the FEIS in context to existing watershed and resource conditions under a no action scenario following the fire. Effects analysis includes documentation of the results of available research to describe predicted effects from the proposed activities.

"Additional information must be provided to the public regarding natural fires and post-burn landscapes to provide balance to a 'Smokey Bear' perspective of fires and forests. "

a. Although post-fire landscapes are often portrayed as "disasters" in human terms, from an ecological perspective, fire is part of the normal disturbance regime and renewal of natural forest ecosystems.

b. An increased appreciation and understanding of natural disturbance regimes in the ecology of forest ecosystems is needed by the public, and the public's land managers.

Although outside the scope of this analysis, changes in federal wildland fire management are evident in: The Federal Wildland Fire Management, Policy and Program Review (1995), Managing the Impact of Wildfires on Communities and the Environment – A Report to the President In Response to the Wildfires of 2000, and A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy (2001). The National Fire Plan goals are:

- Ensuring sufficient firefighting resources for the future;
- Rehabilitating and restoring fire-damaged ecosystem;
- Reducing fuels (combustible forest materials) in forests and rangelands at risk, especially near communities; and
- Working with local residents to reduce fire risk and improve fire protection.

Specific to the 18 Fire, fire regimes are addressed in both a historic and existing context as well as vegetation conditions. Though fire occurrence is natural within the dry, ponderosa pine plant association group, the fire behavior observed (rate of spread, spotting, intensity, etc.) was not. Fire behavior is largely dependent on the amount, arrangement and condition of fuels and vegetation. The conditions of fuels and vegetation for much of the 18 Fire area was outside the range of historic variability range (HRV), the fire burned at higher intensities over a larger portion of the area than would have been expected if conditions were closer to HRV.

The effects of the 18 Fire are also more severe than would be expected historically. Following fires these same sites are outside the historical range of variability in amounts of snags and logs (Everett, 1995). Unless dead material is removed and stands are subsequently managed for historical tree densities, future fuel loading will be outside the historical range of variability for dead and down, creating the potential for more intense reburn situations. The "intense reburn" assumption is based on the physics of fire behavior, the greater the amount of available fuel the greater the fireline intensity in British Thermal Units and the difficulty of fire suppression (Rothermel, 1983).

Recommendations Concerning Fire Management

"Fire suppression activities should be conducted only when absolutely necessary and with utmost care for the long-term integrity of the ecosystem and the protection of natural recovery processes."

This recommendation is outside the scope of the 18 Fire Recovery Project FEIS. Minimum impact suppression techniques, such as using existing roads to anchor firelines were used on the 18 Fire whenever possible. Specific environmental effects of fire suppression activities on the 18 Fire are discussed under Existing Condition of the Soil Resource.

"When land ownerships are mixed, the federal land management agencies should establish policies to prevent conflicts between re-establishment of natural disturbance regimes on federal land and the protection of private property."

This proposal for policy change is outside the scope of the 18 Fire Recovery Project FEIS. All lands within and adjacent to the 18 Fire Recovery Project Area are under federal ownership.

The National Fire Plan goals include identification of natural fire regimes, and condition class, and working collaboratively with local land owners and residents to identify fire risk and reduce fuel hazards especially near communities.

"Postfire Management on Forested Public Lands of the Western United States", (*Conservation Biology*, Volume 18 Issue 4, August 2004)

The general themes that emerge throughout this paper: (1) native species are adapted to natural patterns and processes of disturbance that produce and maintain diverse ecosystems, and (2) reducing the negative effects of past management practices and avoiding additional impacts of future practices will promote regional recovery of biodiversity.

The authors note that: "While "active restoration" may be required in some postfire situations (Kauffman et al. 1997), such activities should be carefully considered and aimed at complementing natural recovery processes. Benefical active restoration activities might include reducing sediment production from firelines and roads, replacing faulty drainage structures, and planting native species depleted by fire or previous management activities." The following text in bold is broad headings contained in this document followed by how it was addressed.

Promoting Natural Recovery Processes

The authors mention under this heading that rehabilitation of firelines, roads and planting of conifers may be needed where seed sources of native species have been lost by fire. As noted in the FEIS, ponderosa pine would be replanted where the seed source has been lost and bitterbrush would be planted on road closures. Soil disturbances from fire suppression activities were stabilized to prescribed rehabilitation requirements immediately following control of the fire. None of these soil disturbances caused cumulative increases in detrimental soil conditions for any of the activity areas proposed for salvage logging (FEIS, Chapter 3). Based on the disturbed area estimates for Alternative 2, the percentages of detrimental soil conditions would increase above existing conditions by approximately 12 to 14 percent in each of the proposed activity areas (FEIS, Table 3-4). This would leave at least 84 percent of the unit areas in an undisturbed condition. Soil restoration treatments (subsoiling) would be applied to reduce the cumulative amount of detrimentally compacted soil within all eight of the proposed activity areas (FEIS, Chapter 2). Subsoiled areas would have favorable soil physical conditions that improve the soils ability to supply nutrients, moisture, and air that support vegetative growth and biotic habitat (FEIS, Chapter 3).

Fireline rehabilitation has already been accomplished. No fire lines were constructed in any riparian areas because none exist within or adjacent to the fire area.

Alternative 2 takes the approach that the uncertainties in post-fire recovery management, do not support choosing either a passive or active management philosophy but strives to blend them with a limited removal of fire-killed trees, reforestation and road closures and obliterations to provide for both high quality wildlife habitat and commodity production.

See discussion in Appendix G above.

Protecting Soils

Although the 18 Fire caused high mortality of overstory trees, ground-level heating was typically not elevated to temperatures capable of altering soil properties that affect site productivity and the hydrologic function of soils (FEIS, Chapter 3). Water infiltration through exposed mineral soil and partially consumed litter was comparable to unburned mineral soil outside the fire perimeter (BAER Soil Specialist Report, 2003). Although the fire killed vegetation and reduced evapotranspiration rates within affected areas, most of the water yielded from this landscape is still expected to be delivered to streams as subsurface flows that emerge at lower elevations outside the project area. The sandy textures of the dominant ash-influenced soils have high infiltration and percolation rates that account for low amounts of overland flow and natural erosion. Monitoring results of similar soils and previous fires on the district indicate that overland flow of water and evidence of surface erosion is typically non-existent in burned areas with gentle slopes (FEIS, Chapter 3). The absence of stream channels within or adjacent to the project area assures that there is no potential for eroded sediments to reach any listed 303(d) water bodies or cause indirect, adverse effects to essential fish habitat (FEIS, Chapter 3).

As disclosed in the FEIS, management direction is incorporated into soil restoration objectives that would be applied to reduce cumulative levels of detrimental soil conditions anticipated from this project. There are no violations of Regional policy (FSM 2520, R-6 Supplement No. 2500-98-1) or LRMP management direction for maintaining and/or enhancing soil conditions in any of the activity areas. None of the activity areas would exceed the Regional and LRMP standard of 20 percent detrimental soil conditions following salvage harvest activities (FEIS, Table 3-4).

The environmental consequences are discussed at length in the FEIS, Soils section in Chapter 3. Also see responses to DEIS Comment Letters 7-11, 7-58, 7-69, 7-71, 8-10, 8-11, 8-23 and 8-61 in Appendix H.

There is no potential for overland flow of sediments to reach stream channels outside of the project area (FEIS, Chapter 3) combined with the absence of any riparian areas obviates any concern over effects to aquatic systems. The sandy textures of the soils derived from Mazama ash have high infiltration and percolation rates and hydrophobic conditions are not a concern.

Detrimental soil conditions (Table 3-4) would remain considerably below Regional standards after completion of salvage harvest.

Banning Introduction of Exotic Species

Grass seeding and introduction of exotic species would not occur.

Curtailing Livestock Grazing

As noted in the FEIS under the Range Allotments section, the area has been inactive since 1990 and grazing would not occur until vegetation recovery has occurred.

Restricting Postfire Logging

Due to the extent of moderate, light and unburned areas, there are no major concerns associated with ground-based harvest systems on the dominant soils and landforms affected by this fire (FEIS, Chapter 3). The activity areas proposed for ground-based salvage logging do not occur on landtypes that contain sensitive soils (FEIS, Chapter 3). None of the proposed activity areas overlap landtypes with steep slopes greater than 30 percent (FEIS, Figure 3-1), potentially wet soils with seasonally high water tables, or sensitive soils with high erosion-hazard ratings that would require special mitigation. On gentle to moderately sloping terrain, the maneuvering of equipment generally does not displace soil surface layers that would qualify as a detrimental soil condition (FEIS, Chapter 3, FSM 2520 definitions). Accelerated surface erosion is not a major concern because adequate soil cover currently exists to control erosion on the dominant soils and landforms that were affected by the 18 Fire (FEIS, Chapter 3). All applicable BMPs would be applied to control surface erosion on and adjacent to roads and logging facilities that would be used during project implementation (FEIS, Chapter 3).

The management requirements, mitigation measures, and BMPs listed for the soil resource (FEIS, Chapter 2) are all designed to minimize, avoid, or reduce potentially adverse impacts from the ground-disturbing activities proposed with this project. Although equipment traffic can decrease soil porosity on volcanic ash-influenced soils, compacted sites can be mitigated by tillage with a winged subsoiler (Powers, 1999). Adequate amounts of snags and coarse woody debris would be retained following project activities to maintain soil biological integrity and provide habitat for dependent wildlife species.

Alternative 2, as noted above, includes many of the recommendations provided by Beschta et al in their paper “Wildfire and Salvage Logging”, 1995. As noted by the authors in their 2004 paper “Logging may be suitable where accelerated soil erosion and increased soil compaction are unlikely to occur and where there will be no impairment of hydrologic and soil biological integrity.”

Although some additional compaction can be expected (Table 3-4) only areas which meet these criteria were included in the salvage proposal. Salvage logging is prohibited on sensitive sites, riparian areas, fragile soils, severely burned soils, roadless areas, watersheds where sedimentation is already a problem, and where significant impacts to early successional vegetation, surface erosion or mass soil erosion are likely to occur.

Prohibiting New Road Construction

Accelerated short- and long-term sediment production from roads is not a concern and although an estimated 3.5 miles of temporary road would be established there would be no effects on aquatic systems or accelerated erosion. All temporary roads would be obliterated by tilling (subsoiling). No permanent roads would be constructed or reconstructed. The flat terrain does not necessitate landing construction.

The following (**in bold**) from The Declaration of Jonathan J. Rhodes in the United States District Court for the Western District of Washington at Seattle, June, 2004 was also considered pertinent to this appendix:

B. Logging and fuel treatments are unlikely to reduce the adverse effects of fire on watersheds and aquatic resources.

C. Logging and fuel treatments are unlikely to reduce fire impacts due to their transient effects and a low probability of high severity fire.

The FEIS recognizes that there is no universally accepted view on reburn potential and intensity (FEIS, Chapter 3, Fire and Fuels section). Although snag removal is often done to reduce likelihood and intensity of re-burns, no studies have documented the effect of this practice in actual fires (McIver and Starr, 2000). Only a few studies have examined how fuel treatments affect fire behavior, but those that have do indicate that fuel treatments can reduce fire impacts (Martinson and Omi, 2003). The contribution of large woody fuel to surface fire intensity is likely underestimated in fire behavior models (Brown et al. 2003). The removal of larger snags probably reduces fire severity and spread potential, but the magnitude of the effect is not known. The FEIS is not concerned with the transient effects of fuels reduction but instead focuses on the size and amount of CWD needed for wildlife habitat and the potential for soil damage at the log/soil interface due to sustained, elevated temperatures from the consumption of CWD in a dry, ponderosa pine plant association type where complete combustion of CWD, regardless of diameter, is the norm.

APPENDIX H
Response to Comments and Agency Letters

Introduction

A 45-day comment period for the 18 Fire Recovery Project Draft Environmental Impact Statement (DEIS) was provided for interested and affected publics, including appropriate local, state, and federal government agencies and Tribes. This period lasted from July 2, 2004 through August 16, 2004. During this period, the Forest Service received comments from different sectors of the public, with a range of concerns and questions. Some comments resulted in a clarification of discussions within the DEIS. The responsible official is considering the comments in the decision-making process.

Substantive Comments: Comments that are within the scope of the proposed action, have a direct relationship to the proposed action, and include supporting reasons for the Responsible Official to consider"

The Forest Service received 10 different responses during the comment period, from 11 sources. The completed comment record and coded substantive comments are kept within the 18 Fire Recovery Project public record and are available for review at the Bend-Ft.Rock Ranger District, Bend, Oregon. The following table lists the comment letters received.

Comments Received During the DEIS 45-Day Comment Period[2].

Letter	Author	Organization
1	Troy Reinhart	
2	Gordon Baker	
3	John Morgan	Ochoco Lumber Company
4	Glen Ardt	Oregon Department of Fish and Wildlife
5	Judith Leckrone Lee	U.S. Environmental Protection Agency
6	Charles H. Burley	American Forest Resource Council
7	Doug Heiken/James Johnson	Oregon Natural Resources Council/Cascadia Wildlands Project
8	Asante Riverwind	Blue Mountains Biodiversity Project
9	Dean Richardson	
10	Barbara Schroeder	

Comment Analysis Process

Public responses submitted regarding the 18 Fire Recovery Project Draft EIS were documented and analyzed using a process called content analysis. This is a systematic method of compiling, categorizing, and capturing all public viewpoints and concerns submitted during the official comment period in response to the Draft EIS. Information from public field reviews, office visits, letters, phone calls, emails, and other sources are all included in this analysis. Content analysis helps the USDA Forest Service clarify, adjust, or incorporate additional technical information in preparation of the FEIS.

Interdisciplinary team specialists read all public responses and identified separate substantive comments within them that relate to a particular concern, resource consideration, or requested management action. Each comment was categorized by resource, utilizing a code for each public response that has been specifically tailored to record letter number and comment number. Each

relevant comment is coded and verified for accuracy and consistency. The IDT members provided responses to comments where appropriate.

Finally, it is important to recognize that the consideration of public comment is not a vote-counting process in which the outcome is determined by the majority opinion. Relative depth of feeling and interest among the public can serve to provide a general context for decision-making. However, it is the appropriateness, specificity, and factual accuracy of comment content that serves to provide the basis for modifications to planning documents and decisions. Further, because respondents are self-selected, they do not constitute a random or representative public sample. NEPA encourages all interested parties to submit comment as often as they wish regardless of age, citizenship, or eligibility to vote. Respondents may therefore include businesses, people from other countries, children, and people who submit multiple responses.

Every substantive comment and suggestion has value, whether expressed by one respondent or many. All input is read and evaluated and the IDT attempts to capture all relevant public concerns in the analysis process.

There are two main principles crucial to capturing the full range of public concerns - context and the need to capture respondents' sentiments and reasoning. They underscore the complexity of the coding process. A single comment referring to two or more resource areas could be legitimately coded to any of several categories. Innumerable permutations among multiple resources, perspectives, and emphases add to the complexity. The specialists have made every attempt to classify comments in a way that fairly represents respondents' concerns, and that facilitates the planning team's efforts to respond to those concerns.

Comment Response

Each similar comment was combined using a title or theme to help the reader easily find responses to similar comments.

The IDT reviewed the comments and responses from each resource and considered the substance of the concerns across all applicable natural resource elements, evaluated whether they triggered a change in the environmental analysis, and drafted responses. For some concerns, they reviewed the original letters or other input to ascertain the full contexts for the concern statement.

Responses are written to address these public concerns. In general, the agency responded in the following five basic ways to the substantive public comments as prescribed in 40 CFR 1503.4: 1) Modifying alternatives; 2) Developing and analyzing alternatives not given serious consideration in the DEIS; 3) Supplementing, improving, or modifying the analysis that the DEIS documented: 4) Making factual corrections; and 5) Explaining why the comments do not need further Forest Service response.

This response document follows the organization of the public concern summary as prepared by the IDT.

Comments in Support of Alternative 2

"I support the most aggressive and economically profitable salvage of timber from the 18 Fire. It is essential for the reforestation of the area, good forest ecology and for the economy that the maximum amount of timber is salvaged." (1-1)
"I approve of and support the Forest Service selection of Alternative 2, which proposes a balanced effort of salvage and ecological restoration of the fire-damaged area. It is apparent that all of the critical elements associated with fire restoration were considered in

the study that led to your recommendation. Alternative 2 reflects good stewardship of our national forests by the Forest Service." (2-1)
"We support the purpose and need for action to commercially harvest the burned trees to recover their economic value and to expedite restoration activities following the recent catastrophic wildfires. In addition, we support activities that will reduce high fuel loads." (3-1)
"ODFW supports the removal of dead trees in Alternative 2 given the Forest's intention to retain adequate trees for snags and down logs." (4-1)
"I am in favor of this project, both salvage and reforestation." (9-1)
"'We encourage you to move forward as quickly as possible with this proposed project." (3-7)

No response necessary.

AIR QUALITY
"We recommend including an analysis of any potential impacts of prescribed fire on visibility conditions in the Three Sisters Wilderness Class I airshed in the final EIS." (5-2)

Response # 1: Additional analysis of any potential impacts of pile burning on visibility conditions in the Three Sisters Wilderness was included in the FEIS. The Oregon Smoke Management plan (Oregon Revised Statutes 477.013) administered by the Oregon Department of Forestry and Department of Environmental Quality takes into account all Designated Areas and Class 1 Federal areas. A mitigation measure (FEIS page 29) is included to address this concern. On burn day, persons responsible for burning operations modify their firing and mop-up procedure to consider effects to Class 1 airsheds and sensitive areas. Monitoring is done by the State Forester to insure compliance with the smoke management program and to determine the effectiveness of smoke management procedures. Real time air quality monitoring data is available to the State Forester through a computer link with the Department of Environmental Quality and is used by Forest Service personnel to schedule prescribed fire operations.

Given the level of uncertainty associated with prescribed fire weather forecasts, if a certain threshold is reached where particulate release is undesired, such as impacting a sensitive area, firing operations are ceased and immediate mop-up procedures are initiated.

BEST AVAILABLE SCIENCE
"The agency has an obligation to respond in the final NEPA document to responsible opposing viewpoints concerning the consequences of the proposed action." (7-79)
"The Forest Service is applying outdated analysis and management prescriptions and rejects without adequate explanation the best available science with respect to post-fire management that is contained in the "Beschta report." (7-1)
"The EIS should respond to the new peer-reviewed Beschta report in the latest issue of the journal Conservation Biology. The DEIS only talks about the old Beschta report and dismisses it based on faulty data and analysis. (7-12)

Response # 2: The IDT reviewed the most current science available during preparation of the FEIS, including the new peer review Beschta report, 2004. The literature is cited throughout the document and listed in the Literature Cited section including opposing viewpoints. Alternatives 2 and 3 were designed to incorporate many scientific viewpoints including Beschta (see Beschta discussion in the Range of Alternatives, comment section). Also, a point by point response to the Beschta report is located in the FEIS, Appendix G.

"The authors (Franklin) do not recommend leaving 3 snags/acre over 13.5" dbh. They recommend removing post-fire fuels to the extent they are uncharacteristic. The 18 fire was not uncharacteristic. Large fires stand replacing fires in ponderosa pine forests may be rare but not unheard of." (7-6)

Response # 3: As noted in the comment "Large fires stand replacing fires in ponderosa pine forests may be rare but not unheard of" acknowledges that the 18 Fire was uncharacteristic. Alternative 2 removes some of the uncharacteristic post-fire fuels loads, while leaving a minimum of 3 snags/acre over 13.5" dbh within the fire salvage areas, juxtaposed with non-salvage areas that range from ½ acre to 15 acres (FEIS, Chapter 2, Alternative 2). The total percent of the 18 fire that has salvage proposed is @50 percent (Table 2-1) under Alternative 2. Franklin, Sexton, Brown, etc were used to determine characteristic levels of fuel loading, and the appropriate level of fire salvage for the dry, ponderosa pine plant association (Chapter 3, Forest Vegetation and Timber Management; Fire and Fuels).

"The DEIS (p 79) says that DecAID is the most current scientific information which seems to ignore the fact that"

> ***"DecAID is NOT: … a snag and down wood decay simulator or recruitment model [or] a wildlife population simulator or analysis of wildlife population viability. … Because DecAID is not a time-dynamic simulator … it does not account for potential temporal changes in vegetation and other environmental conditions, … DecAID could be consulted to review potential conditions at specific time intervals and for a specific set of conditions, but dynamic changes in forest and landscape conditions would have to be modeled or evaluated outside the confines of the DecAID Advisor." (7-7)***

"The bottom line is that current management at both the plan and project level does not reflect all this new information about the value of abundant snags and down wood." (7-27)
"The Forest Service relies on outdated science (and Standards & Guidelines based on that same bad science) to determine snags to be retained." (7-35)

Response # 4: Desired conditions of snag and CWD habitat are based in part on management recommendations and guidelines provided by the Deschutes National Forest Land and Resource Management Plan, Deschutes National Forest Wildlife Tree and Log Implementation Strategy and Eastside Screens as modified by the best available science contained in the Interior Columbia Basin Final Environmental Impact Statement (ICBEMP), ICBEMP DEIS, DecAID, Beschta and other literature (Chapter 3, Wildlife). An extensive time-dynamic simulator analysis of fuels, snags, green trees and snag recruitment is located under the Forest Vegetation and Timber Management section of Chapter 3.

BIG GAME
"The agency must address the adverse effects of salvage logging on big game habitat, especially in areas allocated for big game management in the applicable resource management plan." (7-50)
"The 18 Fire burned a significant portion of designated Deer Winter Range. The DEIS proposes to log this designated area, however the agency fails to address the need to designate new additional DWR to provide for the needs of these species." (8-57)

Response # 5 The effects of salvage logging on big game habitat is addressed extensively under the Wildlife section of Chapter 3. None of the alternatives identified the need to designate new additional DWR to provide for the needs of big game.

"***There is also no doubt that big game use dead and down trees for cover. The removal of large number of dead trees and hazard trees through salvage logging, will make a bad situation worse for big game and exacerbate LRMP violations. The DEIS does not look at both ends of the temporal cover gap. The DEIS over-emphasizes the "development" of big game cover in the future, but fails to recognize the value of retaining that cover which currently exists." (7-9)***

"Although fire may have reduced big game habitat, salvage logging will make a bad situation worse by reducing cover and delaying recovery of vegetation species that are favorable for foraging and hiding cover. Even dead trees can provide hiding or thermal cover for a period of time. The NEPA analysis must assess the lost cover associated with salvage logging of dead trees, either those killed by the fire or that will die in the near term from fire-related damage." (7-49)

Response # 6: The retention of 60 percent of the dead snags greater than 4" dbh on the salvage areas (Table 3-13) juxtaposed with non-salvage areas that range from ½ acre to 15 acres (FEIS, Chapter 2, Alternative 2) and retention of all dead snags on @ 50 percent of the fire area (Table 2-1) combined with identified road closures (Chapter 3, Roads and Transportation), topographic cover, reforestation and a road closure order were designed to address short-term big game cover needs. Over the long-term a seasonal road closure in deer winter range would address cover needs (FEIS, page 5).

"***The DEIS also builds roads in violation of big game road density standards, and makes an unsupported claim that salvage logging will facilitate big game movement." (7-10)***

Response # 7: Target open road densities in the LRMP are used as a threshold for further evaluation rather than an absolute standard (LRMP, pg. 4-115). None of the action alternatives build or reconstruct any permanent roads (FEIS, Figure 3-30). Alternative 2 establishes 3.5 miles of temporary road to facilitate salvage. "Following timber harvest operations, the temporary access routes would be obliterated and reconditioned to a natural state" (FEIS, pg.165).

BIRDS

"The NEPA analysis failed to consider significant new information on pileated woodpeckers including:

- ***a. Pileated woodpeckers need more and larger roosting trees than nesting trees. They may use only one nesting tree in a year, they may use 7 ore more roosting trees.***
- ***b. West of the Cascades, pileated woodpeckers tend to prefer nesting in decadent trees rather than snags.***
- ***c. West of the Cascades, standing snags are important foraging sites because down wood may be too wet to harbor carpenter ants (the favored foods of the pileated woodpecker).***
- ***d. West of the Cascades, Pacific silver fir is often used for nesting (but not roosting).***
- ***e. West of the Cascades, western redcedar is often used for roosting (but not nesting)." (7-36)***

Response # 8: The 18 Fire area is located "east" of the Cascades (Figure 1-1). The action alternatives would have no effect because it is normally absent from the area. It rarely uses pure ponderosa pine habitat. Any future occupancy would likely be incidental and short-term in the pursuit of insects attracted to the area (FEIS, pg.94).

"Be sure to protect the following bird species of conservation concern to the U.S. Fish & Wildlife Service . . ." (7-74)
Response # 9: All MIS, species of concern, and focal birds species were considered in the Wildlife section of Chapter 3 (FEIS). There would be no or only minor short-term negative effects on any of these species.

"***Goshawks also have an extensive foraging territory. It is likely that nesting pairs may utilize both or either underburned portions of the area as well as adjacent older green forest areas. It is also likely that burned, open-forest edge areas within the proposed logging units may be utilized as additional occasional foraging territory by this species. The DEIS fails to address impacts to this species such as how logging removal of remaining canopy cover, and further fragmentation of the area's forests, will affect adult and juvenile Goshawks, or other direct, indirect, or cumulative effects to the species. The DEIS fails to disclose if there are any Goshawk historic—or seasonally rotated-- nesting areas within or adjacent to the proposed logging "units." (8-49)***

"***We are concerned about the affect of the planned transformation of the commercial logging units from burned snag forests, to open near barren terrain where insufficient remaining snags are incapable of providing for the forest-cover which is necessary for continued goshawk use of this area."(8-50)***
"***The proposed tree re-planting may also harm current and historic mixed conifer habitat needed by this species (Goshawk), if the replanting shifts these forest stands to false, agency formula-concocted, open single-storied forest or single species "forests" in areas which were historically more diverse in species composition or age groupings." (8-51)***

Response # 10: Effects to the goshawk including nesting and foraging habitat is discussed on page 93, FEIS in the Wildlife section. The 18 Fire is identified as a Plant Association Group ponderosa pine dry (FEIS, pg.139). There is no mixed conifer habitat within or adjacent to the 18 Fire.

The proposed project area contains goshawk nesting and foraging habitat within unburned, lightly burned, and areas of mixed intensities. There is no proposal to alter these habitats.

"Compliance with both the NFMA and the MBTA requires that all alternatives presented within the DEIS must be capable of protecting forest habitat for these many native forest species, and of reversing any current downward population trends. Such a course of proactive protective action is also required by the ESA and the NEPA, Presidential and USFS directives, and the Migratory Bird Treaty Act, as well as credible conservation science and ethical integrity. However, in violation of these legal and ethical requirements, the DEIS presents action alternatives which would severely imperil neotropical and native avian species populations, resulting in both individual mortality to these species as well as irreparable harm to already seriously impaired habitat." (8-52)
"Further, the DEIS did not deal with the direct, indirect and cumulative impacts that the project would have on migratory birds. The USFS has on record a study by Brian Sharp ("Avian Population Trends in the Pacific Northwest" as cited above), which concludes that commercial logging in public forest lands in Oregon plays a significant role in the continuing population declines of several neotropical migrant bird species. The failure to disclose the full conclusions and implications of this study in the DEIS is particularly egregious in that the study was done for Region 6 of the Forest Service specifically on Central and Eastern Oregon forests. The lack of adequate scientific assessment of this study fails to meet NEPA's requirement for high quality scientific analysis that would

satisfy the "hard look" standard. Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 353 (1989); Blue Mountains Biodiversity Project v. Blackwood, 161 F.3d 1208 (9th Cir. 1998) cert. denied, Ochoco Lumber Co. v. Blue Mountains Biodiversity Project, 119 S.Ct. 2337 (1999)." (8-55)

"***The past and continuing logging-oriented management of the forests of Oregon and Washington, which provide nesting and fledgling habitat for numerous migratory birds, has resulted in severe ongoing population declines in forest canopy-dependent migratory and native birds. (reference: "Avian Population Trends in the Pacific Northwest" by Brian Sharp). Among the many avian species experiencing population declines due to Forest Service logging projects are: band-tailed pigeon, rufous hummingbird, olive-sided flycatcher, winter wren, song sparrow, golden-crowned kinglet, pine siskin, solitary vireo, willow flycatcher, tree swallow, red-eyed vireo, yellow warbler, yellow-breasted chat, and others as well. This information was not adequately addressed in the DEIS despite the obvious direct adverse impacts to many migratory and native bird species from the removal of forest canopy cover and forest structural continuity which would occur with the implementation of this project." (8-54)***

"***The proposed logging would further seriously reduce existing forest-dependent migratory bird habitat, which has already been significantly diminished due to the cumulative impacts of past management and the resultant severity of the fire. The proposed logging "units" would also irreparably fragment migratory bird habitat. Areas that were not logged would also be negatively impacted by generalist bird species favored by the environmental conditions created in highly fragmented logged-over forests." (8-53)***

Response # 11: Discussions on all possible species that could utilize the 18 Fire area were not included within the analysis. Species chosen for analysis were those listed as Threatened or Endangered by USFWS, Regional Forester's Sensitive Species, Management Indicator Species, Deschutes National Forest LMRP, Migratory Focal Species from Altman 2000, and Birds of Conservation Concern from USFWS. These representative species cover the range of habitats within 18 project area. Many species do not have habitat within the project area; others do not have habitat within the proposed units due to the lack of vegetation. The direct, indirect, and cumulative effects are displayed for each of these chosen for analysis.

Current population trends were disclosed for some species not for others. NatureServe. 2003. Nature Serve Explorer: An online encyclopedia of life [web application]. Version 1.8. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: September, 2004) was used as a source. Trend data for all avian species has been added to the FEIS, Chapter 3, in the Wildlife section.

The Brian Sharp paper was not used to determine current population trends. Sharp looked at Breeding Bird Survey (BBS) data from 1968 through 1994. The author ties population trends to habitat availability. The author states, "The period that BBS data are available coincides with the period of most intensive timber harvest from national forests in the Pacific Northwest." Habitat loss was greatest during that time. The author also noted "Declines of neotropical migrants and residents were less pronounced in the period 1980 to 1994 than 1968-1994. Average harvest levels were substantially reduced in the 1990's." The author shows that more species are increasing on National Forests during 1980 to 1994, than declining. Harvest levels as well as logging practices have changed dramatically since 1994.

Trend data from 1968 to 1994 for snag habitats and birds may not be an accurate description of current trends because of the reduction in harvest and current logging practices that utilizes less regeneration harvest and leaves more snags and down wood. Ohmann, in a 1994 paper,

recognized the change in logging practices. "Furthermore, snag densities in older stands on previously harvested sites reflect logging practices quite different from those used today."

The 18 Fire reduced fragmentation by turning approximately 2,420 acres into an early seral stage. Reducing snag densities on 1,936 acres of this habitat does not create fragmentation. Snag strategies are in place to provide various densities across the landscape. There is no proposal to salvage any green trees. The proposal would provide varying habitat across the project area.

Reference: Sharp, Brian E. 1996. Avian Population Trends in the Pacific Northwest. The Institute for Bird Populations. Bird Populations #: 26-45; Ohmann, McComb, & Zumrawi; Snag Abundance For Primary Cavity-Nesting Birds On Nonfederal Forest Lands In Oregon And Washington; Wildlife Society Bulletin 22:607-620, 1994 http://www.fs.fed.us/pnw/pubs/journals/ohmann-snagabundance.pdf Altman, Bob. 2000 Conservation Strategy for Landbirds of the East-Slope of the Cascade Mountains in Oregon and Washington, Version 1.0, Prepared for the Oregon-Washington Chapters of Partners in Flights; Helen M. Kim, Chopping Down the Birds: Logging and the Migratory Bird Treaty Act, 31 Envtl. L. 125 (2001). Also refer to: Chapter 3 Wildlife, Wildlife (Snags and Down wood); Chapter 3 Wildlife, Threatened and Endangered Species; Chapter 3 Wildlife, Regional Forester's Sensitive Species; Chapter 3 Wildlife, Management Indicator Species; Chapter 3 Wildlife, Survey and Manage Species; Chapter 3 Wildlife, Species of Conservation Concern.

"As has been the case in many national forest areas this past century, when burned areas are commercially logged, among the many harmful impacts is the loss of viable habitat for black-backed woodpeckers and other post-fire associated species. Among the significant irreparable harms caused by such logging, are: 1) the loss of species in the area which predate upon bark beetles and other insect; 2) serious continuing population declines of black-backed woodpeckers (Oregon State listed as Sensitive) and forest dependent neo-tropical migrant birds; 3) significant increases in the adverse impacts of unchecked bark beetle populations." (8-65)

Response # 12: Effects on black-backed woodpeckers and other fire opportunists is discussed at length in the FEIS (Wildlife, Chapter 3). Alternative 2 (proposed action) would have insignificant effects on the population viability of this species (black-back woodpecker) because large numbers of snags would be retained, including substantial patches and the scale of the project is small in relation to the species range (FEIS, pg.94).

BOTANY
"Both pre-fire, and post-fire, botanical surveys must be disclosed for the project area. Within a severe burn area such as this, all listed, and proposed listed, plant species and their habitat—including especially soils and soil moisture retention capacity--must be protected." (8-35)

Response # 13: There are no listed threatened or endangered plant species that are known to exist within or adjacent to the project area. Botanical resources including surveys are discussed at length in the FEIS (pgs. 108 to 117).

CONSISTENCY WITH THE DESCHUTES NATIONAL FOREST LAND AND RESOURCE MANAGEMENT PLAN

"In this case the DEIS fails to disclose how the project will comply with the Deschutes LRMP Standards & Guidelines for soils, big game habitat, and snag habitat." (7-78)

Response # 14: The project is consistent with the LRMP for soils, big game habitat, and snag habitat (see FEIS, Soils, pg.68 to 69, Wildlife, big game and snag habitat, pgs.75 to 104).

CUMULATIVE EFFECTS

"Recognize the effects of compound disturbances such as fire and fire suppression followed by logging and treatment of activity fuels." (7-42)

"In addition to the impacts from the 18 Fire, the area suffers from the adverse cumulative impacts of decades of prior logging. Past logging throughout this area has contributed to the greater area's fragmentation and loss of both LOS and green forest habitat. Portions of the area also experienced severe burns in 1996, and much of these areas were still in long-term recovery from this earlier fire, in addition to the past logging. However, the DEIS for this project fails to adequately disclose and address these extensive cumulative impacts and fragmentation to the area's forests and wildlife, including its soil resiliency and water retention and water table levels. While the 18 fire area may not have any fish bearing streams or even any ephemeral water-courses, its soils play a role in the water retention and water tables levels upon which the area's aquatic systems ultimately depend. However the DEIS fails to address this issue or to analyze the potential impacts of this proposed logging to these systems." (8-7)

"Currently there are three other timber sales, adjacent to the 18 Fire and/or located across the Bend/Fort Rock Ranger District which cumulatively affect available habitat for wildlife species and would further fragment the area's forest. Together these four sales are occurring at approximately the same time period, and in the same geographic area. These sales are: the Kelsey Sale—which is interspersed with the 18 Fire sale, the Lava Cast Sale, and the Lodgepole Mistletoe Reduction Sale. NEPA, as well as ample judicial case law (BMBP vs. Blackwood, Hash Rock, Mule, etc.) very clearly requires that the FS must conduct one EIS process for adjacent and interspersed sales. Synergistically these sales will significantly compound the already extensive adverse impacts across the ranger district to wildlife habitat, forest connectivity, impaired soil conditions, hydrological functioning, and the district's aquatic systems and fish species." (8-8)

"It is clear from our surveys of the project and surrounding area, that the greater area has been significantly harmed by decades of over-logging and excessive road building, significantly fragmenting area forests, harming area soil quality, and the districts watershed resiliency and soil water retention. While the DEIS does peripherally address some of these impacts, it fails to fully disclose the extent and seriousness of these impacts, or the serious declines of forest-dependent wildlife, botanical, and aquatic species populations due to the extensive adverse impacts to their habitat from past and ongoing management actions. The DEIS fails NEPA's legal requirements entirely by failing to conduct one EIS process disclosing and analyzing the impacts of all the past and concurrent sales together." (8-9)

"The 18 Fire area, and much of the surrounding adjacent forests have been extensively logged in the past. The forests throughout are severely fragmented, and it is likely that numerous wildlife species endemic populations suffer from imperiled viability due to the significant adverse cumulative impacts from this prior logging. (8-14)"

"***Third, the DEIS fails to conduct an adequate cumulative impacts analysis for wildlife species and their habitat." (8-38)***

Response # 15: The effects of all past, present, and foreseeable future management activities was included in the FEIS. See FEIS, **Soils**, pages 36 to 74; **Wildlife**, pages 75 to 104; **Fuels**, pages 132 to 137; and **Forest Vegetation and Timber Management**, pages 138 to 155.

ECONOMICS
"With necessary fuel treatment costs factored in, the economic analysis will result in a negative NPV." "The Forest Service economic analysis fails to account for the log-term costs of weed infestations, soil degradation, habitat degradation, fire hazards, etc." (7-15)
"It would be better to admit that fuel reduction and restoration, if done right, will not pay for itself and must be supported by appropriated dollars." (7-82)
"Evidence suggests that the proposed project will not result in positive income." (8-69)

Response # 16: The Economic and Social Analysis (FEIS, pg 121 to 131) clearly shows that timber salvage (Alternative 2-Table 3-18) with fuels treatments costs (Table 3-17) factored in will have a positive PNV.
The PNV would be negative (FEIS, pgs.121 to 131) for all alternatives when including all non-salvage related projects and costs (Table 3-19).
The Forest Service is not mandated by law to show a profit from land management activities.

"The DEIS is incomplete because it fails to provide an adequate economic analysis of the proposed project." (8-67)
"The DEIS fails to contain an adequate economic analysis of the project as a whole and does not include all costs incurred by the proposed project. The DEIS does not analyze or disclose expenditures such as the cost to prepare the project (including administrative overhead, publication costs, survey costs, tree marking costs, etc.), nor does it include expenditures such as reforestation, aquatic, and terrestrial mitigation measures. The DEIS also fails to disclose the added costs incurred by the agency from failing to comply with NEPA, and conducting six nearly identical post-fire EIS projects for both the Deschutes and the Malheur's fires. Included in this assessment should be the costs which will be likely incurred by appeals on each of these six fire projects and six likely lawsuits as well." (8-68)
"In proposing the 18 Fire DEIS timber sale, the Forest Service failed to meet NEPA's requirements to fully disclose the direct, indirect, and cumulative economic impacts of the timber sale program and to give appropriate consideration to environmental amenities in the NEPA process by failing to incorporate important natural resource benefits and externalized costs into the DEIS." (8-70)
Third, the Forest Service violated the Multiple Use, Sustained Yield Act (MUSYA) by failing to incorporate important natural resource benefits and externalized costs into the DEIS and its
timber sales." (8-71)

Response # 15: The FEIS (page 127) does analyze and disclose expenditures such as the cost to prepare the project (including administrative overhead, publication costs, survey costs, tree marking costs, etc.). Direct, indirect, and cumulative economic effects were included in the analysis (pages 131 to 131). Net public benefits are measured by both qualitative and quantitative criteria rather than a single measure or index such as PNV or benefit cost ratio (FEIS, Chapter 3).

EMERGENCY SITUATIONS
"AFRC encourages the Deschutes National Forest to request the Regional Forester issue the Emergency Situation declaration for the 18 Fire Recovery Project." (6-2)

"Please begin work right away!" (9-2)

Response #16: An emergency situation determination is currently under consideration.

FENCING AND CONSTRUCTION
"The Forest proposes to construct a deer proof fence around a 640 acres parcel, which we oppose." (4-2)

Response # 17: The Bend-Ft. Rock Ranger District has removed 3 big game fences (Wampus, Ryan, and Finley) enclosing a total of 1,832 acres during 2004. During the previous 7 years the District has not built any other big game fences and has removed an additional 436 acres of fence. Another 297 acres of big game fencing is planned for removal in 2005. No other big game fences are planned at this time. This 640 acre fence would be removed when the young trees are above browse height.

FUEL LOADING
"This project has no real activity fuel treatment so it will greatly increase fire hazard. Whole tree yarding will not do the job. The branches and tops of dead trees will be far more brittle and tend to shatter upon felling and moving to the landing. The EIS does not disclose this." (7-1)
"The new DEIS must also adequately address current agency plans to scatter smaller diameter limbs and logging slash across the forest floor, thereby increasing the potential for a reburn in the area." (8-64)

Response # 18: Modern mechanized feller buncher systems (FEIS, pg.8) do not fell trees. They are accumulated and placed in bundles for skidding to a landing. District experience with fire salvage of other black-bark ponderosa pine sales has shown negligible breakage. Smaller diameter limbs and logging slash will not be scattered.

"The fuels analysis (pp 127-128) just talks about tons of fuels/acre and does not account for the different degrees of fire hazard presented by different fuel sizes." (7-16)
"The DEIS does not disclose the increased fire hazard caused by leaving 34 small snags/acre with all their fine canopy fuels, while moving a significant portion of the canopies of the large trees from the canopy to the surface fuel profile, and eliminating the offsetting effect of large water-filled snags that will be removed through salvage logging." (7-20)
"The agency's fire/fuel analysis must address these issues and recognize the fact that the fine fuel associated with snags (i.e. the branches) fall to the ground over time and decompose over time." (7-51)
"If fuels must be removed, the agency should remove the smaller fuels that are most hazardous and leave the largest logs that are least flammable and most valuable for habitat and other ecological services." (7-62)

Response # 19: One goal of this project it to manage future fuel loads and fuel arrangement to be within a manageable range for both fire control and ecosystem processes (FEIS, pg.132). Currently, the fire hazard is low, however within 15 to 20 years as the snags fall and

accumulate over the burned area, shrubs and grasses will be the dominate fuel type with a higher risk of high severity ground fire. During the next 40 years modeling shows that the small diameter snags (less than 12 inch dbh) and limbs will exhibit considerable decay (FEIS pgs.138 to 155) and as a result enhance soil productivity (FEIS pgs. 36 to 74). In other words, any increased fire hazard caused by leaving small snags within the salvaged area will largely be negated by decay and the extended time period during which they fall.

"The NEPA analysis asserts that leaving large numbers of snags is unsafe and the NEPA document describes an undesirable scenario with respect to the no action and restoration alternatives, but the NEPA document fails to acknowledge the fire risks associated with salvage logging including: (a) salvage logging will remove most of the largest logs that least prone to burn (because large logs hold the most water the longest and they have relatively high ratios of volume to surface area), (b) salvage logging leave behind almost all of the smallest material which is most prone to drying and burning (e.g., relatively low ratio of volume to surface area), (c) the proposed action may lop and scatter the tops of large trees that are too big for the ground-based harvest machinery, (d) salvage logging equipment and workers could start fires, (e) increased human access increases the risk of human caused ignition, (f) the replanting will create a fuel load that is dense, uniform, extensive, volatile, and close to the ground (During an extreme weather conditions this is one of the most extreme fire hazards in the forest)." (7-60)
"The NEPA document also fails to disclose that NOT salvage logging (e.g., natural recovery) may have some countervailing benefits in terms of fire risk and reburn potential, including: (a) large logs store water, (b) standing snags provide some shade, (c) regrowth tends to be more patchy and less dense and continuous, (d) fuels in the form of branches and dead trees fall to the ground slowly over time and have a chance to decay as they added, (e) falling snags over time ten to break up the continuity of fuels in the form of brush and reprod." (7-61)
"The agency is not permitted to saddle the no action alternative with a worst case scenario in terms of future fire. The NEPA document describes the no-action alternative in terms of its inherent high risk of intense future fire, but the NEPA document lacks any recognition that during favorable conditions of weather and fuel moisture a low-severity or mixed-severity fire could occur in the project area and such as fire would likely accomplish much of what this project is attempting to accomplish without all the adverse consequences from ground disturbance. This shows a strong bias against the no-action alternative." (7-64)
"The agency's bias is further evidenced by the fact that the NEPA analysis fails to disclose that during extreme weather conditions (hot, dry, and windy) a canopy fire could easily kill the forests areas whether they are treated or not." (7-65)
"***The agency's use of inaccurate "tons per acre" fuel load formulas also violates the NEPA and contradicts the reality of credible science such as this report. This flawed formula fails to account that large diameter logs and snags are not fuel loads—and should not be counted as part of the fuel load tonnage per acre." (8-21)***
"***Selection of the logging alternative would only set the stage for even more severe fires in this area in the future. Added to this would be the increased risk of fire due to extensive small diameter seedlings and trees (as these seedlings mature) mixed in with the dried out, solar exposed woody debris left by the logging operations, and the abundance of small diameter snags—and future downed small diameter logs-which too would be left." (8-22)***
"***Extensive intense fires such as the 18 Fire generally leave largely medium to large diameter limbs, trees, snags, and logs. These have been clearly shown in scientific research to not only not be a fuel loading problem, contrary to the DEIS's false assertions and formulas, but instead medium and large diameter logs and snags act as moisture reservoirs for many years after drought and wildfire. This has been well proven in a study by MP***

Amaranthus, DS Parrish, and DA Perry entitled "Decaying Logs as Moisture Reservoirs After Drought and Wildfire" which was published by the USFS in "Proceedings of a Watershed '89" on pages 191-194." (8-63)
"Decaying Logs as Moisture Reservoirs After Drought and Wildfire" (Amaranthus, Parrish, and Perry), clearly shows that medium to large diameter snags and downed trees are not only not fuel loads but that these act as water reservoirs, which, even after months of drought and post fire conditions, contain water. These size logs and snags serve important roles in the forest ecosystem, providing additional essential sources of moisture retention as well as both habitat and nutrients as they break down and decay—replenishing the forest soils. There is no credible ecological need to remove most of these size logs and snags—especially any snags above 12" to 16" dbh or more." (8-20)

Response # 20: Regardless of burn intensity almost all existing down logs were consumed by the 18 Fire (FEIS pg 38 to 40). Complete consumption of down logs under wildfire conditions, regardless of size, is characteristic of the ponderosa pine dry plant associations on the Bend-Ft.Rock Ranger District. One of the objectives of this project is to reduce the likelihood of stand replacement fire in regenerated stands, particularly during the early stages of stand development to promote long-term survival and growth of young conifers (FEIS pg.133). It is also understood that the fuels treatment prescribed for the 18 Fire will not eliminate wildfire, but will significantly reduce the resistance to control of any fire that may develop within the project area.

The Forest Service has reviewed Amaranthus et al, 1989. The literature cited references to the Douglas-fir forests of the Siskiyou National Forest. The Siskiyou is typically influenced by coastal weather patterns at 44 air miles (study plot) and 40 inches of rainfall as compared to an interior east Cascade weather pattern and 12 inches of precipitation for the 18 Fire. The 18 Fire is a much drier site, where large logs can dry out much more quickly. Amaranthus, 1987, discusses the moisture holding ability of logs in advance stages of decay (Class II and III). All down logs and snags that existed pre-fire and remain, would be retained. All trees that were killed by the fire would not be in the advanced stages of decay as discussed by Amaranthus et al. Amaranthus, et al acknowledges the following: "*A balance between fuel management guidelines and protection of the wood component of forest soils is critical. Large accumulations of woody residue can create a potential for wildfires of increased intensity, which would result in a lack of organic material and thus limit subsequent growth."* Although the report has merit, the applicable science is limited in this eastside forest type, where the west side weather and harvest techniques differ from the site-specific conditions associated with the 18 Fire area. On the Bend-Ft. Rock Ranger District, fuel moisture samples have been taken monthly from April to November from 1996 to present. The Lava Butte site where measurements are taken is within a 4¼ mile of the fire perimeter. Trends show that the large wood moisture drops below 18 percent every year between May and October. Eighteen percent (18 percent) is a threshold where total large wood and duff consumption is likely.

The falling of snags does not change the continuity of fuel loadings in the form of brush and tree reproduction, but it does change the arrangement of fuel depth. The FEIS does evaluate the fuels conditions with treatment and without treatment and the addition of fuels accumulation from growing vegetation

"Prevention of reburn must not be used as a justification for post-fire logging, without carefully documenting the rationale and providing references to published scientific studies (not just hypotheses and speculation and anecdotes)." (7-39)

Response # 21: The 18 Fire Recovery Project FEIS discloses the potential effects of future fire behavior (FEIS, starting on page 132 to 137). Factors such as resistance to control and fireline intensity were based upon predicted levels of fuels displayed by alternative. Proposed activities are designed to reduce surface fuels to increase the efficiency and potential success of future suppression actions, reduce the severity on soils and vegetation, plus facilitate re-introduction of prescribed fire. The 18 Fire is represented by a fire regime I in the ponderosa pine plant association groups, with frequent, low intensity fires (FEIS, pg.133, Table 3-21).

A discussion on the uncertainty of reburn potential, with scientific literature references, to occur within the 18 Fire area is discussed in the FEIS on page 137. Prevention of reburn is not used as a justification for post-fire logging.

Recent monitoring has shown a correlation between reburn and an increase in detrimental effects to soil and vegetation in portions of the 2003 Booth and Bear Fire (Sisters Ranger District), where they reburned through the 1987 Cabot Lake and Brush Creek fires. Although there were parts of the Cabot Lake and 1996 Jefferson Fire that did not reburn because of lack of ground fuels sufficient to carry the fire, Shank noted an increase in the amount of detrimentally burned soils as a result of subsequent fires in areas that had previously burned.

GRAZING
"The Forest Service should close the grazing allotment and not let the permittee re-occupy the fire area to take advantage of new growth of forage." (7-18)
The fire area must be rested from grazing. 'The NEPA analysis fails to disclose the significant adverse effects of livestock grazing in a post-fire landscape in terms of degrading water quality, spreading invasive weeds, retarding vegetative recovery, soil compaction, etc." (7-52)
"In the short-term, grazing must be eliminated to allow recovery of plants, soil, and to protect water quality." (7-53)
"In the short-term, grazing must be eliminated to allow recovery of plants, soil, and to protect water quality." (7-53) "In the long-term, grazing must be eliminated of the agency is sincere about re-establishing natural fire regimes which depend on natural fuel profiles, which are seriously adversely affected by livestock grazing." (7-54)
"The NEPA analysis must address the cumulative effects of logging and grazing on water quality and discuss the fact that further grazing will retard the attainment of riparian and aquatic management objectives in violation of the applicable land management plan as amended." (7-68)

Response # 23: The 18 fire has one (1) range allotment (Bessie). The last year it was grazed was in 1990. The fire area would be rested from grazing until fall 2005 at the earliest. The Bessie allotment is not currently active and there is no foreseeable use predicted to occur in 2005. The effects of grazing on a post fire landscape are disclosed in the FEIS (pgs. 169 to 173).

There will be no effect on water quality because there are no ephemeral, intermittent or perennial streams within or adjacent to the project area (FEIS, pg. 17). There are no areas of sensitive soils with high water tables or high erosion hazard ratings within the project area (FEIS, pg. 43 to 45). There is no potential for overland flow of sediments to reach stream channels outside the project area (FEIS, pg. 17, 41, and 100).

HAZARD TREE
"The NEPA analysis must at least disclose how many large snags will be protected vs. felled for safety under the preferred alternative." (7-37)
"The NEPA analysis also fails to acknowledge that the public assumes certain risk when recreating on public lands, so not every hazardous tree on every dead end spur road needs to be felled and removed." (7-38)

Response # 24: Alternative 2 was designed for worker safety as well as for snag retention by using clumping (or buffers) where possible (FEIS, Chapter 2, pg.21 and 22). Mechanized harvesting machines do not require felling of snags for worker safety because the machine operators are protected in the cab (personal communication Bend-Ft. Rock Ranger District, FSR, Loren Sessa). Any felling of snags would occur only around landings and would be negligible. Substitute snags are designated for retention to replace any snags needing to be felled for safety (FEIS, pg. 21).

HISTORIC RANGE OF VARIABILITY
"The NEPA document repeatedly invokes the concept of "historic range of variability" (HRV) to justify industrial intervention such as logging and roading. However, the HRV concept is meaningless unless a scale is specified (preferably both a temporal and spatial scale)." (7-63)

Response # 25: The eastside screens, which identified the use and comparison to HRV, indicate that using a regional level is not necessary in an area where disturbance regimes, forest types, and environmental settings are relatively uniform (Page 4 Interim Ecosystem Standard, Eastside Screens). The spatial scale for the fire area is compared to the District Area. The temporal scale used was the condition found prior to European Settlement (FEIS pgs.138 to 155).

INSECTS
"Additionally, as the Forest Service concluded in its study (Crater Lake) on decades of attempting to utilize commercial "salvage" logging to control –or minimize—the spread and adverse impacts of bark beetles, such a method is doomed to failure, as it would require the logging destruction of the very forests they were attempting to "save." (8-66)

Response # 26: The effects of insects and decay is discussed in the FEIS on pages 156 to 159. The FEIS makes no claim that an insect outbreak will be averted by the proposed action (FEIS, pg.158).

LIVE TREES
"Also, we strongly disagree with the decision not to include live trees in the proposed commercial harvest." (3-3)
"Salvage: Protect all live trees (for soil recovery processes and for snag and down wood recruitment.)" (7-45)

Response # 27: The FEIS did not identify a need to harvest dying trees (Purpose and Need, Chapter 1, pg. 5 to 17). The FEIS recognizes that many of the damaged trees will die over the next 10 to 20 years. These "time release" snags will provide needed habitat and help shorten the "snag gap" between when current existing snags fall down and new snags are created by the regenerated forest (FEIS, pgs.75 to 104, and 138 to 155).

MITIGATION
"Each proposed mitigation measure, including all BMPs, must be evaluated at the site-specific level for "effectiveness" and "ability to implement." This analysis must reflect: availability of funding and personnel, institutional constraints, water quality objectives, soils, topography, geology, land-form, channel morphology, vegetation, OHV use, and climate." (7-66)
"Until the agency is able to substantiate its proposed mitigation measures - i.e., that they are appropriate, will be implemented, and will be effective - the agency must withdraw the proposed project." (7-67)
"The agency should disclose and describe the full environmental impacts of the proposed action without compensatory mitigation, then describe proposed mitigation and how it would compensate for the predicted impacts." (7-77)

Response # 28: Mitigation measures and management requirements have all been evaluated for effectiveness and ability to be implemented (FEIS, pgs. 23 to 29). No compensatory or required mitigation was identified in the FEIS.

… "***Some timber sales do not collect enough KV to implement non-required KV." (pp 13-14). The Forest Service has a NEPA obligation to disclose the risk of running out of K-V funds before they are done with the mitigation projects identified in the alternatives." (7-81)***

Response # 29: A K-V funding priority list has been added to Chapter 2 of the FEIS, page 34. No compensatory mitigation was identified in the FEIS. It is anticipated that priorities 1 through 5 would be 100 percent financed with partial funding of reforestation. All the K-V projects are enhancement opportunities and not required mitigation (see response to #25).

MONITORING
"It will be interesting to compare the forest recovery in the salvage area to the recovery in the non-salvage area in the coming years." (2-2)

Response # 30: The USDA Forest Service Central Oregon Interagency Ecology Program has established monitoring plots in the 18 Fire to compare forest recovery in the salvage and non-salvage areas (FEIS, pg.30).

NOXIOUS WEEDS
"This project will seriously spread noxious weeds. The DEIS does not explain how non-noxious but nonetheless invasive weeds will also be spread, and the EIS does not disclose that weed vectors are directly proportional to the magnitude of ground disturbance so the logging alternative will be far worse than the no-logging alternatives." (7-19)

"The invasive weed sites in the analysis area and along all log and gravel haul routes should be fully inventoried and documented as part of the NEPA process for this project." (7-75)

Response # 31: A noxious weed risk assessment, which includes consideration of exotic plants that do not have "noxious" status, was prepared for this project along with weed control measures that will be undertaken during project implementation (FEIS, pgs. 111 to 117). Included is direct, indirect, and cumulative effects, and a discussion of the risks from heavy machinery associated with logging poses for weed introductions and spread. To be included, as a result of the discovery of a new Russian thistle (an exotic species; not noxious)

site in the summer of 2004, will be the requirement to minimize soil disruption at this site. Control measures for weeds were largely effective in preventing introduction or spread of noxious weeds in the 73 acre roadside salvage (District monitoring files).

District weed personnel continue to monitor and treat the 18 Fire and associated system roads.

OTHER COMMENTS RECEIVED

The Forest Service must prepare a new programmatic EIS to consider the effect of salvage logging on young complex forests and the development of complex older forest." (7-22)

"Before relying on DecAID, the agency must prepare a comprehensive NEPA analysis to consider alternative ways of ensuring viability of all species dependent upon snags and dead wood." (7-29)

"It is clear that a programmatic EIS must be conducted for the litany of post-fire sales proposed both in the Deschutes and elsewhere in Region 6 interior Columbia basin forests." (8-72)

"***The agency must prepare a programmatic EIS to comprehensively disclose and consider:***

A. the natural range of variability within interior NW forest ecosystems, and the existing rarity of complex mature and Late/Old Structure forests (LOS) (e.g., forests that are unsalvaged after disturbances). "Since the numbers of large snags are below the natural range of variability across the landscape, the agency must retain all large snags to start moving the landscape toward the natural range of variability, or the agency must carefully justify in the NEPA analysis every large snag it proposes to remove." (8-1) See Jerome J. Korol, Miles A. Hemstrom, Wendel J. Hann, and Rebecca A. Gravenmier. Snags and Down Wood in the Interior Columbia Basin Ecosystem Management Project. PNW-GTR-181. http://www.fs.fed.us/psw/publications/documents/gtr-181/049_Korol.pdf This paper estimates that even if we apply enlightened forest management on federal lands for the next 100 years, we will still reach only 75 percent of the historic large snag abundance measured across the interior Columbia Basin, and most of the increase in large snags will occur in roadless and wilderness areas.

B. the ecological values (such as wildlife habitat) associated with snags, dead wood, and complex forest ecosystems. See Rose, C.L., Marcot, B.G., Mellen, T.K., Ohmann, J.L., Waddell, K.L., Lindely, D.L., and B. Schrieber. 2001. Decaying Wood in Pacific Northwest Forests: Concepts and Tools for Habitat Management, Chapter 24 in Wildlife-Habitat Relationships in Oregon and Washington (Johnson, D. H. and T. A. O'Neil. OSU Press. 2001) http://www.nwhi.org/nhi/whrow/chapter24cwb.pdf

C. given the regional deficit of complex forest ecosystems and the fact that many species, such as woodpeckers and secondary cavity users, appear to be adapted to exploit the structure and resources available within disturbed forests, " . . . the agencies should comprehensively consider and disclose the direct and indirect effects of salvage logging on species associated with complex interior forests." (8-2) The Forest Service has numerous Management Indicator Species whose populations have not been monitored, so the agencies lack the information necessary to ascertain that the salvage logging program will maintain species viability.

D. the effects of salvage logging on the development of complex forest habitat;

E. all the new science related to salvage logging and dead wood, including but not limited to: Beschta R.L., J.J. Rhodes, J.B. Kauffman, R.E. Gresswell, G.W. Minshall, J.R. Karr, D.A. Perry, F.R. Hauer, and C.A.Frissell, In Press. Post fire management on forested public lands of the western USA. Cons. Bio., 18:x-xx. And Rose et al.

F. the cumulative impacts, resulting from the extensive planned and proposed logging projects, to numerous forest-dependent wildlife species, including adverse impacts to

resident, rearing, and foraging habitat as well as adverse impacts to essential wildlife travel routes, including dispersal and migration corridors." (8-1)
"It is clear that a programmatic EIS must be conducted for the litany of post-fire sales proposed both in the Deschutes and elsewhere in Region 6 interior Columbia basin forests." (8-72)

Response # 32: Preparation of a programmatic EIS(s) is outside the scope of this analysis.

"Salvage will retard achievement of riparian management objectives in violation of TM-1 of INFISH." (7-56)
"Salvage logging will set back vegetative recovery that has already started and thereby retard attainment of riparian and aquatic management objectives." (7-57)
"The NEPA document did not address the consequences of erosion and sedimentation within a proper framework of sediment dynamics. Aquatic habitat attributes such as spawning gravel availability or the amount of fine sediment in bed sediments are determined by hillslope sediment inputs and by the capacity of stream channels to store and transport sediment." (7-70)

Response # 33: There are no riparian areas. See response to # 23

"The agency must avoid any reduction of existing or future large snags and logs (including as part of this project) until the applicable management plans are rewritten to update the snag retention standards." (7-28)
"The applicable forest plan requires the agency to monitor the status, trend of various resources and the implementation and effectiveness of Standards & Guidelines. These monitoring requirements are directly related to special status species, water quality soil and many other forest resources that are directly affected by this project. The mandated monitoring requirements have not been met, so the agency should not implement projects affecting these resources until it fulfills its duty to monitor the resources under its care and stewardship." (7-76)
"Don't tier to the outdated forest plan. Certain areas of the forest were allocated to commodity production in the LRMP, but since the LRMP was approved the regional forester has had to adopt several regional plan amendments in order to increase protection for species associated with old forests and aquatic environments (e.g., eastside screens, PACFISH, INFISH). Other significant policy changes have been made outside of the plan amendment process, such as the Lynx Conservation Assessment and Strategy (LCAS), the National Fire Plan, the Healthy Forest Initiative, etc." (7-80)
"***Among these concerns are the agency's continuing use of the archaically outdated Forest Plan, which was adopted in 1990, and has only been peripherally amended to include the barest, inadequate pieces of numerous scientific research reports, conservation science, ecological, wildlife, watershed, and fisheries needs, goals, and objectives.***

Federal environmental policy laws and federal judicial case-law clearly require that agency Forest Plans be periodically updated, and be amended to incorporate new scientific research, ecological needs, and conservation goals." (8-16)

Response # 34: The Forest Plan has been periodically amended since its signing in 1990 to incorporate new scientific information, ecological needs, and conservation goals.

" Fourth, the 18 Fire timber sale(s) would violate the Global Climate Change Prevention Act. 7 U.S.C. § 6701 (2000). Logging national forests exacerbates adverse changes in the global climate by reducing the carbon absorption function of national forests and by releasing carbon stored by these forests into the atmosphere. The adverse ecological and economic effects of increases in atmospheric carbon caused by national forest timber sales has not been disclosed nor incorporated into the DEIS by the Forest Service when it proposed and authored the 18 Fire DEIS. This failure is a violation of the Global Climate Change Prevention Act." (8-72)

Response # 35: Plants, through photosynthesis, convert airborne carbon (CO2) into carbon or cellulous such as branches and boles. This uptake from plants and the oceans are the largest sinks of carbon. When a plant dies, carbon sequestration by that plant discontinues. Since no live trees would be harvested no net increase in atmospheric carbon would occur with this salvage timber sale. There would be a net decrease of atmospheric carbon from Alternative 2 as the dead trees are converted into wood products (carbon sink) and the newly planted trees convert airborne carbon into plant material.

"In the Draft EIS (Page 121), no cost estimate is made for the control of competing vegetation."… *"**A herbicide treatment method should be considered to control competing vegetation around trees."(10-1).***

Response # 36: The cost of matting is included in the estimate of $334,925 for planting 1936 acres. The cost is estimated to be approximately $100 to $150 per acre depending on the number of trees planted and is included in the District Files. Reforestation was considered in this analysis even though the fire and not timber salvage created the need for reforestation (FEIS, page 128). The Region 6 Office is currently looking at the active use of herbicides to reduce the cost of controlling and competing vegetation, however District experience has shown that areas such as the 18 Fire can be successfully reforested without the use of herbicides and the use of herbicides is outside the scope of this project.

PURPOSE AND NEED
" Like the Davis fire DEIS, the 18 Fire DEIS states that the 18 fire was human-caused, but does not disclose what conclusions have been reached—if any—as to whether this was an accidental fire or an intentional arson fire." (8-2)
"Our organization is extremely concerned that the current proposal to commercially log the Deer Winter Range area of the 18 Fire, much like the similar proposal to log the Davis Lake LSR, may be essentially the same as the FS previous proposal to log Warner Creek. It is clear, that unless a management policy is adopted which mandates that all fires which are potentially arson-caused (whether proven or not) can not be proposed for commercial logging sales, no LSR, old growth area, big game winter range, or other administratively withdrawn forest area will be safe from arson, as both the financial incentives and polarized-pro-logging motivations pose too great a risk." (8-3)

Response # 37: After investigation by the Central Oregon Interagency Arson Task Force, the 18 Fire was determined to be human caused fire of undetermined specific cause (FEIS, pg.4).

"We suggest rewriting the "purpose and need" as follows would be a first essential step in this direction: 1) Protect and conserve the natural resources within the fire area; 2) Utilize high quality scientific research and the site-specific needs of the area; 3) Conduct needed

restoration which both provides for the habitat needs of native post-fire forest species and the long-term reestablishment of natural forest conditions." (8-15)
"The 18 Fire DEIS's deceptively Orwellian "Purpose and Need" fails to both incorporate the abundant relevant science regarding post-fire area management, including wildlife as well as ecological needs in burned forest ecosystems, and to disclose the truth of what the agency is actually planning in the 18 post-fire area. Indeed, the purpose and need is in conflict with itself, as recovering commercial value by providing timber products is antithetical to expediting the establishment of a ponderosa pine forest ecosystem." (8-17)

Response # 38: This Purpose and Need stated in comment 8-15 has similar attributes to the 18 Fire Purpose and Need: "Expedite the establishment and restoration of a dry, ponderosa pine forest following a stand replacement fire (FEIS, pg.8)". As noted in the FEIS scientific research was used to address the site-specific needs of the area, while protecting and conserving the natural resources within the fire area. Nothing in the scientific literature suggests that timber salvage as purposed under Alternative 2, followed by planting ponderosa pine trees will not successfully establish a ponderosa pine forest (FEIS,pgs.138 to 155)

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"Inclusion of this clause as part of the purpose and need violates both the NEPA and federal case-law, prohibiting the arbitrary and capricious predisposition of an EIS towards the selection of a logging alternative. Indeed, given this clause, the agency should not have included alternatives 1 or 3 at all, as they do not provide for the agency's interpretation of what constitutes "recovery of commercial value" —leading one to question whether the reason alternatives 1 and 3 were included at all is simply a shallow attempt by the agency to "lawsuit-proof" this DEIS from challenge with the pretense of considering all options." (8-18)

Response # 39: Inclusion of the goal "recover commercial value" does not predispose the Decision Maker from choosing either the no action alternative (Alternative 1) or a non-salvage action alternative (Alternative 3). The NEPA requires consideration of a No Action alternative. Both of these viable alternatives are important for comparative and baseline purposes with an action alternative that includes timber salvage.

RANGE OF ALTERNATIVES
"While your preferred alternative should treat more than 37 percent of the total volume within the fire area, we feel you need to be more aggressive within the scope of the proposed preferred alternative and increase the harvest volume." (3-4)
"Alternative 1 and 3 should not (have) been considered at all. A modified Alternative 2 is the best one." (3-5)

Response # 40: More salvage harvesting was not included because there was a need to provide for high quality forage habitat for woodpeckers, big game hiding cover, and soil productivity (FEIS, pgs.4 to 34)

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"The DEIS also failed to consider another alternative (or a modified alt.3) that would leave all of the large snags and manually treat some of the small fuels <8-12 inches dbh, in order to reduce fire hazard without the loss of snag habitat or the serious adverse effects of heavy equipment and roads." (7-24)
"***The DEIS has failed to develop an alternative which would only remove snags and dead-wood fuels between 4" to 12" dbh, which is supported by conservation-science based***

recommendations that restoration actions could include the thinning and removal of small diameter fire prone fuels up to 12" dbh as needed to reasonably accomplish fuels reduction objectives (snags, downed logs, small diameter live trees wherever they are too densely placed, limbs, ladder fuels, brush, etc.)." (8-19)

Response # 41: As discussed in Response #19 small trees less than 12 inches dbh in diameter are not a current or future fuel concern due to the decay that would occur over the next 20 to 40 years.

"Please consider at least one non-commercial, restoration-only alternative that invests in restoration and recovery of the fire area by, for instance, eliminating livestock grazing, emphasizing native species recovery, not building any new roads, stabilizing soils disturbed by the fire suppression effort, decommissioning unneeded roads." (7-40)
"The NEPA analysis fails to consider a minimal restoration and natural recover alternative." (7-44)
Areas such as the 18 Fire are best left to continue to recover naturally, with the addition of such restoration efforts as are truly needed and helpful—without the additional harms of commercial logging." (8-5)

Response # 42: Alternative 3 was developed to address these concerns (FEIS, pgs. 22 to 23).

"***There must be no logging within Deer Winter Range habitat."(8-6)***

Response # 43: The goal of Deer Winter Range is to manage vegetation to provide optimum habitat conditions on deer winter and transition ranges while providing some domestic livestock forage, wood products, visual quality, and recreation opportunities (LRMP, pg. 4-113).

"***The DEIS also fails to address or incorporate any of our substantive comments, raising questions as to the degree of importance the agency really attaches to citizen and ecological organization's comments during the NEPA process. Is this comment period process merely a window-dressing sham hiding and preceding the implementation of projects which have already been decided upon in advance by the agency?" (8-30)***

Response # 44: Based on scoping and a field trip with representatives of Blue Mountain Biodiversity and PROWL the following changes were made: 1) dying trees were excluded from salvage (FEIS, pg.9); 2) non-salvage clumps were added to Alternative 2 design (FEIS, pg.22); 3) the scenic views management area was excluded from salvage and reforestation (FEIS, pg.11 and 16) an additional 40 acres were excluded from salvage for monitoring the effects of salvage on vegetative recovery (FEIS, pg. 30).

"***However, the basic programmatic direction fails to evidence independent analysis or any meaningful incorporation of the Beschta post-fire management science." (8-29)***
"Also, consider an alternative modeled on the recommendations of the Beschta report" (7-41).
"The failure of the agency to incorporate Beschta Report recommendations, include those which call for leaving at least 50% of the snags of all diameter classes." (8-32)

Response # 45: The Forest Service agrees with Beschta et al. that care should be taken in designing salvage projects. The 18 FEIS contains an extensive array of guidelines and

procedures to prevent and mitigate environmental impacts during timber salvage and restoration activities (FEIS pg 23 to 29).

Appendix G of the FEIS documents how the 18 Fire Recovery Project FEIS alternatives incorporate Beschta post-fire recommendations. Alternative 2 is a timber salvage alternative that is modeled after many of the recommendations of the Beschta Report. For example under Alternative 2: no salvage logging would occur in sensitive areas, all live trees would be left, over 50 percent of all diameter classes would be retained, boom-mounted shears instead of conventional ground based equipment would be used, no new permanent roads would be built and many of the existing permanent roads would be obliterated and active reseeding or planting of grasses would not occur. No structural post fire restoration would be implemented although the lack of any surface water within or adjacent to the project area obviates this consideration.

REFORESTATION
"It is important that any replanting done by the agency reflect the historical natural diversity of species composition within this area." (8-4)

Response # 46: As discussed in the FEIS, all areas considered for reforestation (pg 138 to 155) would be planted with ponderosa pine. Except for ponderosa pine, only a few scattered juniper and lodgepole pine exist within the 18 Fire (FEIS, pg 4) and these two species can be expected to regenerate from dormant seed in the soil. Ponderosa pine seedlings will be grown from locally collected seed within the Bend/Fort Rock Ranger District and breeding zone (FEIS, pg 147).

ROAD CLOSURES
Only roads that are in poor locations should be considered for decommissioning. Keep as many roads as possible open for rehabilitation work and for future fire access, as well as for administrative and recreational uses." (3-6)
"I would like to see the roads in the area kept open after timber harvesting and I would like to see only ground based timber harvesting methods used." (1-2)

Response # 47: The Roads and Transportation section of the FEIS (pages 163 to 165) discusses the roads analysis that was done for this project. This analysis was used to identify roads needed for future administrative and recreational access, as well as roads that will not be needed. Alternative Design got timber salvage would utilize modern, ground-based, feller-buncher systems and designated skid roads to minimize soil disturbance (FEIS, pg 8).

"Consequently, EPA supports the measures included in the proposed Alternative 2 that would decommission 7.0 miles and close 2.9 miles of roads within the forest." (5-1)
ODFW supports the forest's proposal to reduce road densities by closing and rehabilitating 3.5 miles of temporary roads, decommissioning another 7.0 miles and closing an additional 2.9 miles of roads. Further, we recommend road density be reduced to 1 mile per square mile and enforced from December 1 to March 31 to protect wintering mule deer." (4-3)
"We didn't see where the forest would restrict OHV travel to designated roads and trails as purported during project planning. We recommend the Forest close the area to OHV travel except on designated roads and trails." (4-4)

Response # 48: Currently the 18 Fire project area has an area closure (FEIS, page 5). After the area closure is lifted a seasonal road closure from December 1 to March 31 to protect wintering mule deer will be implemented.

ROADS
"However, the agency has also proposed the construction of 3.5 miles of so-called "temporary roads." These new roads are slated to only be closed by the purchaser after project completion, rather than obliterated and removed completely." (8-24)
"***The DEIS fails to disclose if the tally of remaining roads—including all functional roads (and closed "temporary roads")—fails to meet Forest Plan (FP) standards, and fails to disclose how far this tally remains in violation of FP standards in general, or how the agency plans to correct this." (8-25)***
"***Action alternative 2, while pretending to reduce area road density, actually would introduce roads into presently unroaded portions of the project area--further degrading and fragmenting an already damaged ecosystem which is in violation of Forest Plan standards." (8-26)***
"***We herein emphatically state that absolutely no new roads of any kind, including so-called "temporary roads" as well as logging skid trails, skyline routes, or other management openings which further fragment the area forests (including helicopter landing decks) can be constructed within this severely fragmented forest area." (8-27)***
"***After a thorough reading of this DEIS, one is left to wonder if there are any uninventoried roadless areas or defacto roadless areas anywhere within or adjacent to the project area, and what potential impacts the proposed logging may have on contiguous forest areas." (8-28)***
*"****The DEIS fails to adequately discuss the impacts to elk and deer, and other wildlife, from the proposed logging – including proposed road construction and reconstruction –as well as the impacts from the proposed logging and the extensive fire. The DEIS fails to disclose the effectiveness – or lack thereof – of road closures in the area." (8-58)***

Response # 49: Alternative 2 establishes 3.5 miles of temporary road to facilitate salvage. "Following timber harvest operations, the temporary access routes would be obliterated and reconditioned to a natural state" (FEIS, pg.165). Target open road densities in the LRMP are used as a threshold for further evaluation rather than an absolute standard (LRMP, pg. 4-115) and the remaining 1.9 miles/square mile of open road (FEIS, Figure 3-30) would meet LRMP target open road densities.

No uninventoried roadless areas or defacto roadless areas exist withn or adjacent to the project area (FEIS pg 17).

As noted in the roads and transportation section of the FEIS (Figure 3-30) there is no road reconstruction. Effects on deer and elk are discussed on pages 75 to 104 of the FEIS. Road closure effectiveness is high (FEIS, pg 26).

SCENIC VIEWS
"The NEPA analysis must address the negative scenic impacts of salvage logging relative to natural recovery." ***(7-59)***

Response # 50: There are no proposed treatments in Scenic Views (FEIS, pg 11 and 16). The effects of the alternatives, including salvage logging, on Scenic Quality is discussed on pages 166 to 168 of the FEIS.

SNAGS/DOWN WOOD
"We do support Alternative 2, your preferred alternative, however we feel that snag levels should not exceed the Forest Plan level (3-2)

"Snag retention standards and the DEIS analysis of the value of snags and down wood are not based on high quality science." (7-5)
"The agency's reliance on DecAID in its pseudo "analysis" of potential impacts to snag dependent species fails to recognize that "DecAID is NOT: … a snag and down wood decay simulator or recruitment model [or] a wildlife population simulator or analysis of wildlife population viability. …" (8-33)
"The DEIS lacks a temporal dimension required to understand the long-term effect of salvage logging on snag habitat. Salvage logging will remove too many large snags and lead to future violations of LRMP standards for snag habitat." (7-4)
"Be sure to use the DecAID tool appropriately. The agency must address the dynamics of snag habitat over time, by accounting for snag fall rates and snag recruitment rates which are not accounted for in the DecAID advisor." (7-31)
"Blind reliance on DecAID is inappropriate. DecAID does not pick the management objective." (7-30)
"DecAID tolerance levels need careful explanation. These tolerance levels are very difficult to put in terms that are understandable by the general public, but if the Forest Service is going to use this tool they must make it understandable." (7-33)
"***The agency NEPA analysis should disclose the published literature with higher levels of snag and wood retention and discuss their potential relevance for the project." (7-32)***

Response # 51: As noted under Response #4, desired conditions of snag and CWD habitat are based in part on management recommendations and guidelines provided by the Deschutes National Forest Land and Resource Management Plan, Deschutes National Forest Wildlife Tree and Log Implementation Strategy and Eastside Screens as modified by the best available science contained in the Interior Columbia Basin Final Environmental Impact Statement (ICBEMP), ICBEMP DEIS, DecAID, Beschta and other literature (Chapter 3, Wildlife).
As noted DecAid was used appropriately as one of many guides to determine appropriate snag level retention and alternative design juxtaposed with non salvaged clumps of snags. A time-dynamic simulator analysis of fuels, snags, green trees and snag recruitment is located under the Forest Vegetation and Timber Management section of Chapter 3.
A literature review that incorporates the range of studies of snag levels and wood retention is discussed in the wildlife section of the DEIS and Appendix B.
In the past the Deschutes Wildlife Tree and Log Guide and the Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards For Timber Sales (East Side Screens), as it amends the Deschutes Forest plan, has been used for managing snags and coarse woody material. In 2002 a new tool was developed called Decayed Wood Management Advisor (DecAID) (Mellen et al., 2002) to help specialists manage snag and log levels best suited for their management area and associated wildlife species. The DecAID advisor arose from the recognition by the Pacific Northwest Region, USDA Forest Service, of the growing need to update guidelines for managing snags and down wood. Based on direction to use the best available science and guidance to manage habitat for wildlife species, DecAID is a summary, synthesis, and integration of published scientific literature, research data, wildlife databases, forest inventory databases, and expert judgment and experience. The information presented on wildlife species use of snags and down wood is based entirely on scientific research and does not rely on modeling the biological potential of wildlife populations. DecAID is an advisory tool to help managers evaluate effects, of forest conditions and existing proposed management activities on organisms that use snags and down wood. It also can help managers decide on snag and down wood sizes and levels needed to help meet wildlife management objectives. DecAID presents information on wildlife use of snag diameter, snag density, down wood diameter, and down wood percent cover, and on the range of natural (unharvested) and current (all) conditions of snag density

and down wood percent cover by diameter classes. The information is presented at three statistical tolerance levels which may be interpreted as three levels of "assurance:" low (30 percent tolerance level), moderate (50 percent tolerance level), and high (80 percent tolerance level). (Marcot et al. 2002).

The stand types associated with the project area are low elevation, ponderosa pine dry. The rational to choose a tolerance level is based on the aspect of the habitat type and the fire regime. The ponderosa pine dry PAG has a lower moisture level due to aspect and stand orientation and fires within it were probably high frequency and low intensity. Due to the frequent low intensity fires and lower vegetative production, snag and CWD levels were historically lower in these areas. Tolerance level for ponderosa pine dry would be managed at the 50 percent tolerance level. The 50 percent tolerance levels for ponderosa pine/Douglas fir (Small-Medium) Habitat Type/Structure is displayed in Table 3-9.

"Salvage: Protect all large snags." (7-46)
"At most, no trees over 12" dbh should be logged as the area has suffered far too much tree mortality and loss of habitat cover already. All medium to large snags are essential for continued habitat for woodpeckers, such as Oregon State sensitive listed Black-backed, as well as the use of the area by numerous other avian species—and the prey of these species who depend upon the many snags for habitat." (8-12)
"This project will drive the regional ecosystem further from the natural range of variability, because the entire eastside is already far below NRV for large snag habitat, and this project will remove thousands of large snags. If anything needs to be done to restore the NRV it is to remove ingrowth, that is, small material that grew up as a result of fire suppression." (7-2)
"***The NEPA analysis must account for all the values provided by snags and down wood and the effect of removing these legacy structures." (7-25)***
"***While we agree that snags and down wood must not be averaged over wide areas, we also must emphasize that snags and down wood are far below historic levels on non-federal lands, so in order to ensure viable populations of wildlife and avoid trends toward ESA listing, federal lands must be managed to compensate for the lack of down wood on non-federal lands." (7-34)***
"According to Table 3-8, Lewis' woodpeckers need 25 snags/acre, and White-headed woodpeckers need over 50 snags/acre, but the DEIS does not clearly disclose how these objectives will be met with salvage logging that removes all but 3 snags/acre. The DEIS fails to even recognize a management objective related to Black-backed woodpecker." (7-3)
"***Pages 88-94 clearly show that salvage logging will reduce snag habitat below recommended levels for many species, but the DEIS fails to disclose snag levels will only get worse for the next several decades!" (7-23)***

Response # 52: Both Alternatives 1 and 3 would retain all snags. Table G-2 page 52 shows the percent of dead and green trees retained by diameter class for all alternatives. A total of 55.7 percent of the large dead trees would be retained under Alternative 3 and 68.8 percent of the large dead and remaining large live trees

A discussion of the Historic Range of Variability is located in the Forest Vegetation and Timber Management Section of Chapter 3. The effects and values of snags and down wood and removing a portion of those is covered extensively in Chapter 3.

The wildlife section of the FEIS did not identify that any of the alternatives would lead to a trend towards ESA listing of any of the species associated with the 18 Fire project area. As

noted in the FEIS there are no private lands within or adjacent to the project area (FEIS, Chapter 1).

Species such as Lewis' and white-headed woodpeckers are provided for by leaving unsalvaged clumps within the salvage units and by leaving much of the fire unsalvaged. For example Table 3-13 shows post salvage snag and CWD levels by diameter class. Under Alternative 2, over 1,800 acres would not be salvaged and all of the snags on those acres would be available habitat for these and other associated species.

"Table 3-9 on page 81 of the EIS appears to be based on inventories that reveal "average" conditions that ignore the natural pulse of snags that would be expected after wildlife." (7-8)

Response # 53: Snag levels following the 18 Fire are at higher levels than naturally found (FEIS, page 143). As noted on page 82 of the FEIS, Table 3.9 represents general desired conditions for snags and down wood.

"The DEIS does not disclose the cumulative effects of salvage logging on habitat for wildlife associated with snags and dead wood." (7-21)
"Recognize the effects of compound disturbances such as fire and fire suppression followed by logging and treatment of activity fuels." (7-42)
"Recognize that dead and down wood are key elements of the forest ecosystem." (7-43)

Response # 54: Cumulative effects of salvage logging and other management activities within and adjacent to the project area on habitat for wildlife associated with snags and down wood and other species associated with the project areais covered extensively on pages 75 to 104 of the FEIS.

"In order for the NEPA analysis to fully address the snag habitat issue it must look carefully at the snag gap from both ends.

- ***a. The snag gap begins when too many of the current snags are gone. So the snag gap is exacerbated on the front end by salvage logging which removes too many large snags.***
- ***b. The snag gaps ends when the next stand grows to the point that it contains large trees and some of them die, so the snag gap is exacerbated on the back end if there is a significant delay in tree regeneration." (7-47)***

"Snag retention should be both clumped and well-distributed, not all clumped." (7-48)

Response # 55: The FEIS recognizes that many of the damaged trees will die over the next 10 to 20 years. These "time release" snags will provide needed habitat and help shorten the "snag gap" between when current existing snags fall down and new snags are created by the regenerated forest (FEIS, pgs. 75 to 104, and 138 to 159). In addition, green trees that survive the fire will be available to be made into snags if needed. A time dynamic simulator was included of the snag gap in the Forest Vegetation and Timber Management section of the FEIS. Planting trees would shorten this gap considerably along with the retention of all remaining live trees and complete retention of all trees within low mortality areas where additional mortality from insects can be expected both within and contiguous to the 18 Fire perimeter (FEIS 156 to 159).

As noted before snags would be both clumped and well-distributed (Response #52).

"***The proposed snag retention levels of the logging alternatives fail to address the likely increased windfall of the retained snags due to the logging-caused openings throughout the forest." (8-45)***
"***The proposed snag retention levels of the logging alternatives fail to address the likely increased windfall of the retained snags due to the logging-caused openings throughout the forest." (8-45) "The logging alternatives fail miserably to provide habitat for any avian species other than flickers (which are more tolerant of openings), hairy woodpeckers, red tail hawks (foraging habitat perhaps), and other non-forest canopy-dependent species--which are currently in abundance due to decades of over-logging having created far more open forest, clear-cut "meadows" and young sapling-congested even-aged stands." (8-46)***

Response # 56: Increased windfall of snags from logging caused openings has not been documented on the district. Snags because of the lack of green needles are very wind resistant compared to live trees. See Response # 52 for species and snag retention discussion.

SOILS
"Salvage logging and associated activities will cause cumulative impacts on soil that violate requirements to maintain 80% of soils in a non-detrimental condition." (7-11)
"The cumulative effects of standard logging practices are likely to violate soil standards." (7-71)

Response # 57: Managing soils for sustained productivity is a key issue identified on pages 14, 36 and 37 of the FEIS. There are no violations of Regional policy (FSM 2520, R-6 Supplement No. 2500-98-1) or LRMP management direction for maintaining and/or enhancing soil conditions in any of the activity areas proposed with this project. The environmental consequences are discussed at length in the FEIS on pages 36 to 74.

As disclosed in the FEIS (page 51 to 52), management direction is incorporated into soil restoration objectives that would be applied to reduce cumulative levels of detrimental soil conditions anticipated from this project. Existing detrimental soil conditions are mainly associated with existing roads and range from less than 1 percent to 3 percent of the unit areas. FSM 2520.3 specifically states: "In activity areas where less than 20 percent detrimental soil impacts exist from prior activities, the cumulative amount of detrimentally disturbed soil must not exceed the 20 percent limit following project implementation and restoration" (FEIS, page 52). Under Alternative 2, subsoiling treatments would be accomplished as described in a mitigation measure (FEIS, page 24 to 27), but this is not a mandatory part of the proposed actions which is required to comply with Regional and LRMP standards and guidelines for maintaining soil productivity. As disclosed in Table 3-4, none of the activity areas would exceed the Regional and LRMP standard of 20 percent detrimental soil conditions following salvage harvest activities.

The primary goal for managing the soil resource is to maintain or enhance soil conditions at acceptable levels without impairment of the productivity of the land (FEIS, page 52). One of the goals for meeting the purpose and need for this project is to expedite the establishment and restoration of a dry, ponderosa pine forest following a stand replacing fire (FEIS, page 8). Since it is unlikely that these activity areas would be re-entered for mechanical harvest within the next 40 years (FEIS, Table 3-24), some immediate soil restoration is included in the proposed actions to improve the hydrologic function and productivity on disturbed sites which also helps promote the recovery of pine trees and other native vegetation.

"Soil degradation occurs at thresholds that are not detected by the FS definition of "detrimental soil conditions" the NEPA analysis based on these criteria will underestimate the effects of management. NEPA requires the agency to disclose all soil impacts not just those that meet these arbitrary criteria." (7-13)
"Soil Quality Standards underestimate soil impacts. Soil degradation occurs at thresholds that are not detected by the FS definition of "detrimental soil conditions" the NEPA analysis based on these criteria will underestimate the effects of management. NEPA requires the agency to disclose all soil impacts not just those that meet these crude criteria." (7-72)

Response # 58: The Pacific Northwest Region (R-6) and all other Forest Service Regions established soil quality policy and standards that limit detrimental soil disturbances associated with management activities. Based on the best available technical data and professional judgment, standards for determining detrimental compaction, puddling, displacement, and severely burned soils were developed for monitoring observable and measurable soil characteristics that do not require expensive or time-consuming laboratory procedures. The threshold value (20 percent) is considered to be the smallest detectable change (statistically) at operational levels of monitoring. It is intended to be a warning when adjustments in management practices need to be made to prevent unacceptable loss in soil productivity. This soil quality standard and policy was incorporated at the Forest level under the Deschutes Land and Resource Management Plan (LRMP), as described on pages 51 and 52 in the FEIS. Also see response # 65.

The appropriate time to raise concerns about LRMP standards and guidelines is during the Forest Planning or Revision process. The relevancy of this threshold standard or other management direction is outside the scope of a project-level analysis.

"The DEIS (p 61) asserts that "logic and experience suggest" that logging trees over 12" dbh while leaving trees <12" dbh will result in "less intensive future wildfires." This is unsupported by the science which clearly indicates that fire hazard reduction will require removal of small material and fire hazard reduction does not require removal of large material." (7-17)

Response # 59: This comment quotes selectively and leaves out the rationale that lower fire intensity and less potential for severely burned soil would occur in areas where some of the hazardous fuels are removed through management treatments. There is no suggested correlation with the diameter size of salvaged trees. The only discussion about small-diameter trees (less than 12 inches) is the expectation that many of these dead trees will likely fall to the ground within 3 to 5 years. Experience during post-fire field assessments (BAER) indicates that severely burned soils are typically found where extreme temperatures of long duration were caused by the complete consumption of downed logs or residual stumps. On the eastside of this forest, even large-diameter logs (greater than 12 inches) are typically consumed by wild land fires during the dry summer months when fuel moistures are low. Regardless of the diameter size, heavy fuel loadings of down woody debris increase the potential for intense ground-level fires and excessive soil heating capable of altering soil properties that affect site productivity.

"Please consider all the many values of snags and down wood presented in Rose, C.L., Marcot, B.G., Mellen, T.K., Ohmann, J.L., Waddell, K.L., Lindely, D.L., and B. Schrieber. 2001." (7-26)

Response # 60: The **F**EIS acknowledged the values of snags and down wood by developing issue indicators which were used to evaluate predicted changes in the amount and composition of these important landscape components. The management requirements built into the action alternatives ensure that adequate amounts of snags and coarse woody debris would be retained following project activities to maintain soil productivity and provide habitat for dependent wildlife species. The minimum requirement of 1.4 percent (surface area) coverage of down wood for wildlife habitat would also meet the soil resource objective of 5 to 10 tons of CWD per acre to provide nutrient supplies and desirable biological benefits for maintaining soil productivity (FEIS, pg. 27).

Under natural conditions, the amount of down woody debris will gradually increase as fire-killed snags fall to the ground over time. Post-fire sampling estimates indicate that potential biomass from down woody debris could range from 40 to 60 tons per acre within areas affected by stand-replacement fire (Plot Sampling, 2003). Under Alternative 2 (proposed action), the predicted fuel load would be reduced to an acceptable range of 15 to 20 tons per acre (FEIS, pg. 135).

"The NEPA analysis must consider research suggesting that the rapidity of mycorrhizae formation in young plants following disturbance may be critical. Borchers and Perry, "Effects of Prescribed Fire on Soil Organisms, Chapter 13 in Natural and Prescribed Fire in Pacific Northwest Forests, Walstad, Radosevich, and Sandberg, editors, OSU Press." (7-55)
"Respect the soil foodweb. In undisturbed ecosystems, the soil foodweb is a tightly coupled below-ground ecosystem that directly affects many above ground processes such as succession, plant establishment and growth, and erosion and water quality.
In a forest, this below-ground ecosystem is fed primarily by photosynthates exuded from the fine roots of trees. These photosynthates feed a plethora of bacteria and fungi species which feed thousands of arthropod and nematode species and so on. Each species fills a niche and represents both a sink and a source and of nutrients for other organisms.
Logging will kill trees and cut off the supply of photosythate which forms the basis of this food web, so the tightly coupled nutrient retention systems will be disrupted, allowing nutrients to "leak" from the system.
Burning slash piles also kills the below ground ecosystem and soil compaction from road building and other heavy equipment kills or destroys habitat for many soil dwelling species and shifts the below ground ecosystem from aerobic to anaerobic.
The NEPA document fails to consider these significant effects." (7-73)
"The DEIS does not sufficiently recognize the importance of mycorrhizal fungi on forest growth and productivity." (8-60)

Response # 61: The FEIS acknowledges that mycorrhizal fungi and other soil organisms depend upon the continuing input of woody debris and fine organic matter for maintaining favorable biotic habitat. A balance between management practices and ensuring adequate amounts of coarse woody debris (CWD) is an important goal for managing the soil resource (FEIS, page 46). Using mycorrhizal fungi as a bio-indicator of productive forest soils, research studies were used to develop conservative recommendations for leaving sufficient CWD following management activities (Graham et al. 1994, Brown et al. 2003). These recommendations were incorporated into a management requirement for this project (FEIS, page 27). Under Alternative 2, existing sources of woody debris and surface litter would be retained on-site and protected from disturbance to the extent possible. Enough fallen trees, broken limbs, and other logging debris would likely be available in the short-term to meet the

recommended guideline for CWD retention on these dry, ponderosa pine sites (FEIS, page 61 to 62). Also see response to comment 7-26 (above).

Losses of soil microbial and fungal populations most likely occurred where forest litter and duff layers were completely consumed in localized areas of this fire. Heat penetration did not cause severe burning within 2 centimeters of the soil surface in representative burn areas (18 Fire, BAER Soil Specialist Report, 2003). Due to the minor amount of severely burned soil, the post-fire soil environment likely maintained viable populations of soil biota which are capable of responding to nutrient increases and the natural recovery of vegetation (FEIS, page 38 to 40). Vegetative recovery is expected to occur at rapid rates comparable to those observed on the adjacent Bessie Butte, Evans West, and Skeleton fires of 1996 (BAER Soil Specialist Report, 2003). Re-growth of sprouting shrubs and herbaceous forbs and grasses are already establishing live cover in most affected areas. Microbial activity and fungal populations are expected to rebound in response to new root growth and the decomposition of woody debris and surface litter.

The effects of ground-based salvage logging would likely be similar to those observed in unburned stands of live trees. Although the recovery of biotic habitat would be delayed on compacted logging facilities, subsoiling treatments on these sites would improve subsurface conditions by restoring the soils ability to supply nutrients, moisture, and air that support soil microorganisms (FEIS, page 56 to 57). Research studies on the Deschutes National Forest have shown that the composition of soil biota populations and distributions rebound back toward pre-impact conditions following subsoiling treatments on compacted skid trails and log landings (Moldenke et al., 2000).

Under Alternative 2, much of the unusable stemwood and tops would be machine piled and burned on log landings (FEIS, page 55). This fuel reduction method would not cause additional soil impacts because burning would occur on previously disturbed soils that already have detrimental conditions. Subsoiling treatments would be implemented to reduce the amount of detrimentally compacted soil committed to log landings following these post-harvest activities. There would be no machine piling, prescribed burning or hand treatments for reducing and/or rearranging activity-created fuels in random locations of activity areas.

"Salvage logging and associated activities such as site prep, fuel treatment, and planting kills understory vegetation which will significantly reduce site productivity." (7-58)

Response # 62: The development and use of temporary roads, log landings, and skid trail systems for ground-based logging are the primary sources of physical disturbance that would result in adverse changes to soil productivity and understory vegetation. The proposed actions do not include mechanical treatments for reducing activity-created fuels and/or preparing sites for reforestation. Scalping to prepare sites for hand planting would be used to reduce plant competition around the planted seedlings, but this activity would have a negligible effect on overall ground cover and site productivity within activity areas.

Based on the disturbed area estimates for Alternative 2, the percentages of detrimental soil conditions would increase above existing conditions by approximately 12 to 14 percent in each of the proposed activity areas (FEIS, pg. 56 to 60). This would leave at least 84 percent of the unit area in an undisturbed condition with adequate ground cover of understory vegetation and surface litter to protect the soil surface. All reasonable BMPs would be applied to control surface erosion on and adjacent to roads and logging facilities that would be used during project implementation (FEIS, page 67). Soil restoration treatments

(subsoiling) would be applied to reduce the cumulative amount of detrimentally compacted soil within all eight of the proposed activity areas (FEIS, pgs. 24 to 27). Soil restoration treatments, such as subsoiling, are designed to promote maintenance or enhancement of soil quality and the growth of vegetation. Although all pre-impact conditions are not fully restored immediately following treatment, subsoiled areas would have favorable soil physical conditions that improve the soils ability to supply nutrients, moisture, and air that support vegetative growth and biotic habitat (FEIS, pgs. 56 to 57). The recovery of herbaceous vegetation would likely occur within two to three growing seasons following treatment.

"Avoid rather than mitigate soil and water quality. Do not rely on BMPs." (7-69)

Response # 63: The use of mitigation is defined by NEPA policy included in the Council of Environmental Quality (CEQ) Manual. Mitigation measures are specific actions that could be taken to minimize, avoid or eliminate potentially significant impacts on the resources that would be affected by the alternatives, or to rectify the impact by restoring the affected environment (40 CFR 1508.02).

The management requirements, mitigation measures, and BMPs listed for the soil resource (FEIS, pages 24 to 27) are all designed to minimize, avoid, or reduce potentially adverse impacts from the ground-disturbing activities proposed with this project. Project design elements and operational guidelines for equipment use would limit the amount of surface area covered by logging facilities. All reasonable BMPs would be applied to control surface erosion on and adjacent to roads and logging facilities that would be used during project implementation (FEIS, page 66). Subsoiling treatments would be implemented within all eight of the proposed activity areas to rectify cumulative levels of detrimentally compacted soil on temporary roads and logging facilities (FEIS, page 25). If the Responsible Official selects an action alternative, these management requirements, mitigation measures, and BMPs are to be implemented during and following project activities to meet the state objectives for protecting and maintaining soil productivity (FEIS, pgs. 62 to 68).

"Post-fire soils in this area are erosive sandy soils, with many areas of sensitive soils which would be severely disrupted and displaced by the proposed logging. However, if left unlogged, area soils will be spared unneeded further degradation, and both the soil quality and recovery timeline will be improved. It is clear that if the agency is serious in its purported goal to enhance and accelerate the recovery of forest structure in this fire area, it should abandon its proposed logging plans, as such logging will only further degrade and destroy the soils upon which a healthy recovering forest depends." (8-10)
"steep slopes--units located on steep slopes need to be dropped from any proposed commercial logging." (8-11)

Response # 64: As disclosed in the FEIS (pgs. 36 to 74), extensive areas of the project area have been covered by loose, non-cohesive ash deposits that consist of sandy textured soils with little or no structural development. Although equipment traffic can decrease soil porosity on these soil materials, compacted sites can be mitigated by tillage with a winged subsoiler (Powers, 1999). Due to the extent of moderate, light and unburned areas, there are no major concerns associated with ground-based harvest systems on the dominant soils and landforms affected by this fire (FEIS, page 53). The effects of ground-based salvage logging on these soil types are expected to be similar to those observed in unburned stands of live trees.

Under Alternative 2, the majority of the activity areas proposed for ground-based salvage logging do not occur on landtypes that contain sensitive soils (FEIS, pgs. 43 to 61). None of

the proposed activity areas overlap landtypes with steep slopes greater than 30 percent (FEIS, Figure 3-1), potentially wet soils with seasonally high water tables, or sensitive soils with high erosion-hazard ratings that would require special mitigation. The activity areas are located on gentle to moderately sloping terrain where the maneuvering of equipment generally does not displace soil surface layers that would qualify as a detrimental soil condition (FEIS, pg. 51, FSM 2520 definitions). Accelerated surface erosion is not a major concern because adequate soil cover currently exists to control erosion on the dominant soils and landforms that were affected by the 18 Fire (FEIS, pgs. 43 to 45).

The potential for successful regeneration is limited by properties such as soil depth, soil fertility, and temperature extremes on sites such as frost pockets, cold air drainages, and localized areas of rocky lava flows. As disclosed in the FEIS (pgs. 42 to 43), all activity areas proposed for salvage harvest and associated activities meet land suitability criteria for timber management that would allow them to be regenerated or resist irreversible resource damage. Modified harvest prescriptions or other, less intensive treatments are management options that do not apply to reforestation objectives in areas affected by stand-replacement wildfires (FEIS, page 60).

"Logging this area would further adversely impact soil hydrology, resulting in loss of vegetative and snag cover, loss of moisture retaining large diameter snags and logs, impaired soil resiliency and subsurface soil communities, and impaired forest stand recovery. Increased solar exposure of area soils will result in loss of water retention and increased peak flows during heavy rains and snowmelt conditions." (8-23)

"Soil hydrology and potential impacts to soils, including water retention, must be sufficiently assessed, which this EIS fails to do." (8-61)

Response # 65: Although the 18 Fire caused high mortality of overstory trees, ground-level heating was typically not elevated to temperatures capable of altering soil properties that affect site productivity and the hydrologic function of soils. Based on field reconnaissance of post-fire soil conditions, approximately 61 percent of the burned acreage classified as low burn severity and 39 percent classified as moderate burn severity (BAER Soil Specialist Report, 2003). Low severity burns generally do not remove the litter and duff layer, and most organic matter remains incorporated in the soil surface. Most areas that burned with moderate severity still have about half of the surface organic materials left in place. This surface cover will effectively slow the velocity of any overland flow that may occur from intense rainfall events, thereby reducing the potential for surface erosion in burned areas (FEIS, pgs.38 to 39).

The sandy textures of the dominant ash-influenced soils have high infiltration and percolation rates that account for low amounts of overland flow and natural erosion. Measurements of post-fire infiltration rates of surface soils affected by moderate severity burns did not indicate elevated levels of hydrophobic (water repellant) soil conditions that would lead to increased surface runoff and extended periods of soil erosion (FEIS, pg. 39). Water infiltration through exposed mineral soil and partially consumed litter was comparable to unburned mineral soil outside the fire perimeter (BAER Soil Specialist Report, 2003). Although the fire killed vegetation and reduced evapotranspiration rates within affected areas, most of the water yielded from this landscape is still expected to be delivered to streams as subsurface flows that emerge at lower elevations outside the project area. Monitoring results of similar soils and previous fires on the district indicate that overland flow of water and evidence of surface erosion is typically non-existent in burned areas with gentle slopes (FEIS, page 48). The absence of stream channels within or adjacent to the project area assures that there is no

potential for eroded sediments to reach any listed 303(d) water bodies or cause indirect, adverse effects to essential fish habitat (FEIS, pg. 39).

The effects of salvage logging activities would not alter the ecological function of down woody debris within proposed activity areas because existing sources of woody debris and surface litter would be retained on-site and protected from disturbance to the extent possible. The effects of low intensity fire do not easily consume material much larger than 3 inches in diameter, and charring does not substantially interfere with the decomposition or function of coarse woody debris (Graham et al., 1994). Under Alternative 2, salvage harvest operations would be expected to accelerate the accumulation of some additional sources of woody debris where these materials are currently lacking within portions of activity areas (FEIS, page 61). The management requirements built into the action alternatives ensure that adequate amounts of snags and coarse woody debris would be retained following project activities (FEIS, pgs. 26 to 28). Existing down wood and future recruitment of fallen snags will contribute to on-site moisture retention on affected sites.

Based on post-fire field assessments (BAER) of similar fires on the eastside of this forest, even the larger-diameter logs can be completely consumed by intense ground-level fires during dry summer months when relative humidity and fuel moistures are low. Under natural conditions, the amount of down woody debris will gradually increase as fire-killed trees fall to the ground over time. Regardless of the diameter size, heavy fuel loadings of down woody materials increase the potential for intense ground-level fires and excessive soil heating capable of altering soil properties that affect site productivity.

Also see responses number 59, 60, and 61.

"The agency fails to disclose or analyze several studies regarding logging's known detrimental impacts to soils—including a study by David Perry in which he concludes that logging damage to forest soils, which have taken thousands of years to form, may take three centuries or more to fully recover. Other studies such as those by Elaine Ingham address the damage to forest soils by both logging and grass seeding, adversely impacting the ability of tree seedlings to survive. (8-31)

Response # 66: In order to protect or maintain soil conditions at acceptable levels, plans for projects must include provisions for mitigation of ground disturbances where activities are expected to cause resource damage. The best information about the proposed actions (FEIS, pgs. 18 to 34) was used in conjunction with the location of activities to analyze the potential effects on the soil resource. Conclusions were reached through various references, local monitoring of similar activities on volcanic ash-influenced soils, LRMP direction, and nationally and regionally approved soil quality standards and guidelines. These standards and guidelines were jointly developed by soil scientists, land managers, and research scientists from FS Research Stations using the best available technical data and professional judgment. These information sources were used as guidance in determining project design elements and mitigation needs for the proposed actions (FEIS, pgs. 23 to 29).

Direct, indirect, and cumulative effects to the soil resource are addressed in the FEIS on pages 36 to 74. Most soil disturbances would be confined to known locations in heavy use areas (such as roads, log landings, and main skid trails) that can be reclaimed when they are no longer needed for future management. As disclosed in Table 3-4, none of the activity areas would exceed the Regional and LRMP standard of 20 percent detrimental soil conditions

following salvage harvest and soil restoration treatments. Also see response number 57, 58, 62, 63, and 64.

"The DEIS fails to adequately address impacts to area soils from any bulldozing which may have occurred during fire suppression activities. Both bulldozing and the proposed logging would increase the detrimental impacts to area soils and forest ecology." (8-62)

Response # 67: As disclosed in the FEIS (page 40), dozers were mainly used to clear strips of brush along the western and northern fire boundaries. Soil disturbances from fire suppression activities were stabilized to prescribed rehabilitation requirements immediately following control of the fire. None of the soil disturbances caused by bulldozers occur within any of the activity areas proposed for salvage logging. Consequently, soil disturbances from suppression activities do not increase the estimated percentages of existing and cumulative amounts of detrimental soil conditions displayed in Table 3-4. None of the activity areas would exceed the Regional and LRMP standard of 20 percent following salvage harvest and soil restoration treatments.

SOIL CUMULATIVE EFFECTS

"Recognize the effects of compound disturbances such as fire and fire suppression followed by logging and treatment of activity fuels." (7-42)

Response # 68: The effects of the wildfire and fire suppression activities to the soil resource are addressed in the FEIS on pages 38 to 40. The existing condition assessment is summarized on pages 47 to 50 of the FEIS. Although the fire caused high mortality of overstory trees, ground-level heating was typically not elevated to temperatures capable of altering soil properties that affect site productivity (FEIS, page 48). Fire suppression activities did not cause cumulative increases in detrimental soil conditions within any of the proposed activity areas (FEIS, page 49). Cumulative effects to the soil resource are addressed in the FEIS (pages 64 to 68). The overall effects of the action alternatives combined with all past, present, and reasonably foreseeable management activities would be within allowable limits set by LRMP standards and guidelines for protecting and maintaining soil productivity (FEIS, page 68). Also see response number 61 and 67.

"In addition to the impacts from the 18 Fire, the area suffers from the adverse cumulative impacts of decades of prior logging. Past logging throughout this area has contributed to the greater area's fragmentation and loss of both LOS and green forest habitat. Portions of the area also experienced severe burns in 1996, and much of these areas were still in long-term recovery from this earlier fire, in addition to the past logging. However, the DEIS for this project fails to adequately disclose and address these extensive cumulative impacts and fragmentation to the area's forests and wildlife, including its soil resiliency and water retention and water table levels. While the 18 fire area may not have any fish bearing streams or even any ephemeral water-courses, its soils play a role in the water retention and water tables levels upon which the area's aquatic systems ultimately depend. However the DEIS fails to address this issue or to analyze the potential impacts of this proposed logging to these systems." (8-7)

"It is clear from our surveys of the project and surrounding area, that the greater area has been significantly harmed by decades of over-logging and excessive road building, significantly fragmenting area forests, harming area soil quality, and the districts watershed resiliency and soil water retention. While the DEIS does peripherally address some of these impacts, it fails to fully disclose the extent and seriousness of these impacts,

or the serious declines of forest-dependent wildlife, botanical, and aquatic species populations due to the extensive adverse impacts to their habitat from past and ongoing management actions. The DEIS fails NEPA's legal requirements entirely by failing to conduct one EIS process disclosing and analyzing the impacts of all the past and concurrent sales together." (8-9)

Response # 69: Detrimental soil conditions from past management are mainly associated with existing roads and ground-based logging facilities which were used for timber management activities between 1979 and 1992 (FEIS, pg. 45). Although ground-based railroad logging was used to harvest ponderosa pine in portions of the project area during the 1920s and 1930s, it is expected that natural processes have restored soil quality over time. Based on more recent harvest history, it was determined that about 178 acres of previously managed areas occur within the largest of the proposed activity areas (Unit 1). Soil condition assessments were conducted within this portion of Unit 1. There was no overlap of past harvest areas with the other seven activity areas proposed for this project. Table 3-3 displays existing sources and the estimated extent of detrimental soil conditions in acres and percentages for each of the eight activity areas proposed with this project. Detrimental soil conditions are mainly associated with existing roads and range from less than 1 percent to 3 percent of the unit areas. This amount is well within the Regional and LRMP standard of 20 percent. Also see response number 57, 65, and 70.

The re-burn portions of the 1996 Bessie Butte Fire (approximately 77 acres) were low-to-moderate severity burns that consumed mainly brush patches (FEIS, pg. 48). None of the activity areas proposed for salvage logging included these previously burned acres. The Evans West and Skeleton fires of 1996 burned several miles to the east and southeast of the 18 Fire and do not overlap with the project area. Consequently, there are no cumulative effects to soil productivity from other wildfires.

Most of the water yielded from these lands is delivered to streams as deep seepage and subsurface flows that emerge at lower elevations. The nearest perennial stream is the Deschutes River, approximately 7 miles west of the project area (FEIS, page 41). The absence of stream channels within or adjacent to the project area assures that there is no potential for eroded sediments to reach any 303(d) listed water bodies or cause indirect, adverse effects to aquatic systems (FEIS, pgs. 41 and 48).

Also see response number 65 regarding soil hydrologic functions.

"Currently there are three other timber sales, adjacent to the 18 Fire and/or located across the Bend/Fort Rock Ranger District which cumulatively affect available habitat for wildlife species and would further fragment the area's forest. Together these four sales are occurring at approximately the same time period, and in the same geographic area. These sales are: the Kelsey Sale—which is interspersed with the 18 Fire sale, the Lava Cast Sale, and the Lodgepole Mistletoe Reduction Sale. NEPA, as well as ample judicial case law (BMBP vs. Blackwood, Hash Rock, Mule, etc.) very clearly requires that the FS must conduct one EIS process for adjacent and interspersed sales. Synergistically these sales will significantly compound the already extensive adverse impacts across the ranger district to wildlife habitat, forest connectivity, impaired soil conditions, hydrological functioning, and the district's aquatic systems and fish species." (8-8)

Response # 70: As disclosed in the FEIS (page 37), the soil resource may be directly, indirectly, and cumulatively affected within each of the activity areas proposed within the

project area. Burned acres that were originally included in the Kelsey Vegetation Management EA planning area were removed from this project proposal and included in the 18 Fire Recovery Project (FEIS, pg. 67). Since there is no overlap of proposed activity areas with these two project areas, there would be no cumulative increase in the extent of detrimental soil conditions beyond the predicted levels displayed for each of the proposed activity areas in Table 3-4. Likewise, there would be no cumulative soil impacts from implementation of the Lava Cast and Lodgepole Mistletoe Reduction projects because there is no overlap of activity areas within the 18 Fire Recovery project area.

Also see response numbers 65 and 69.

WILDLIFE
"Logging this area would likely result in the extirpation of many of these foraging and resident species, including the likely mortality of some individuals."(8-13)

Response # 71: No extirpations were identified (FEIS, pages 75-104).

"The EIS must disclose the habitat quality, forest stand composition(s), wildlife species utilizing the area, listed and proposed listed species known or suspected to be within the area, as well as aquatic species both within (toads, frogs, salamanders, anything??) and downstream from the area." (8-34)
"***The project's proposed logging would cause nonlisted species to trend towards listing, and listed species to trend toward jeopardy.***" ***(8-41)***
"Threatened, Endangered, and Sensitive Species. The DEIS for this project lists many wildlife species which may or may not exist within the project area. Many of these species are listed as being "suspected but not confirmed" to exist in the area. Apparently there has been little if any agency attempts to adequately survey this area for the existence of these species. As such, the agency is relying upon almost pure guesstimates regarding potential impacts to these species." (8-42)
"Second, the Endangered Species Act (ESA) requires the USFS to use the best available scientific and commercial data in assessing the impacts to species, which includes surveying for them." (8-37)
The DEIS's failure to adequately and responsibly assess the proposed project's potential adverse impacts to wolverine, including the project's likely incremental role in ongoing trends pushing this species towards uplisting under the ESA, violates NEPA and NFMA." (8-48)

Response # 72: There are no TES species within the project area. Habitat for wolverine is not found in or near the project area (FEIS, page 100, Appendix D., Biological Evaluation). There are no direct or indirect effects on any TES species (FEIS, pgs. 99 to 104, Bilological Evaluation, Appendix D).

"Among our many concerns is that of this proposed project's effect on lynx" (8-47).

Response # 73: The best available science was consulted during the assessment of lynx habitat on the Deschutes and Ochoco National Forests and the Crooked River National Grassland and this science indicated that no lynx habitat is present on the Bend-Fort Rock Ranger District or the Deschutes National Forest. Likewise, no lynx habitat has been identified and mapped in the Cascade Mountains of Oregon; therefore, no Lynx Analysis Units (LAUs) have been identified within the project area, on the Bend-Fort Rock Ranger District, or on the Deschutes National Forest. If lynx are confirmed in the project area, on the

Bend/Fort Rock Ranger District, or on the Deschutes National Forest in the future, they would receive full protection under the ESA and consultation with the US Fish and Wildlife Service would commence immediately, if necessary. There has never been a lynx confirmed in the project area. With no lynx or lynx habitat on the district an analysis of lynx prey species is unnecessary (FEIS, pg.100, Biological Evaluation, Appendix D, Canada Lynx).

"Based upon on-the-ground surveys, the habitat quality for all species is in poor condition from poor historic management activities--coupled with the impacts from the fire, which was exacerbated in intensity and extent by past illegal and harmful logging that has occurred throughout area forests under agency management." (8-39)
"***Because extensive good quality habitat will not be available for many years until much of the burned and logged areas of the planning area recover, it is unclear how wildlife species will be affected in the meantime—especially if some of the scant remaining green forest habitat available is logged across the area in other planned contiguous sales--as well as the logging of the majority of the standing large snags-- resulting in further degradation and loss of closed canopy and snag--soil holding--habitat." (8-40)***
"***The DEIS conducts a woefully inadequate review of impacts to wildlife from the proposed commercial logging." (8-36)***

Response # 74: The current wildlife habitat quality for different species is discussed at length on pages 75 to 104 and Appendix D of the FEIS. The clearcut harvesting that occurred when the area was in private ownership (FEIS, page 4) was not illegal. The majority of the large dead trees would be retained (Table G-2) and the cumulative effects of past, present and foreseeable future actions were covered throughout Chapter 3 of the FEIS.

"Management Indicator Species. Given this developing reinterpretation of the legal requirements attendant to management indicator species, it is clear that the multiple mandates in NFMA and its implementing regulations requiring population monitoring and surveying are not being even minimally met for the this proposed project." (8-43)
"Our organizations are very concerned that the planning area does not currently support viable populations of Black-backed, White-headed, and Lewis' woodpeckers, and other cavity excavators". The DEIS fails to indicate any credible surveys, or comprehensive science, which shows that the planning area is meeting the actual "tolerance levels" necessary to function as viable habitat for populations of cavity excavator species, including Black-backed, White-headed and other woodpeckers, as required by the NFMA and regional agency directives." (8-44)
"***There is not sufficient analysis in the EIS of the effects of the proposed project on American marten in the planning area." (8-56)***

Response # 75: Effects on all MIS species that utilize or could potentially the project area are included on pages 75 to 104 of the FEIS.

"***Finally, our organizations point out that the USFS continues to fail to address the cumulative impacts to deer and elk as a result of several timber projects, as well as other area fires, adjacent to the planning area (past sales—with their still overly abundant clear-cuts riddling the area--as well as current and future planned sales). The Deschutes National Forest repeatedly offers timber projects that remove deer and elk habitat, but never analyzes the cumulative habitat loss and how it will affect deer and elk." (8-59)***

Response # 76: Cumulative effects on big game are addressed on pages 96 to 99 of the FEIS.